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The Paper Trade Journal

1924 CONVENTION EXPOSITION AND PAPER TRADE ANNUAL NUMBER

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ESTABLISHED 1872
THE INTERNATIONAL WEEKLY OF THE PAPER AND PULP INDUSTRY AND THE PIONEER PUBLICATION IN ITS FIELD
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PAPER TRADE JOURNAL

Vol. LXXVIII. No. 15 NEW YORK AND CHICAGO Thursday, April 10, 1924

A YEAR OF UNCERTAINTIES IN PAPER

On the Whole However, Profits Have Been Reasonable and Business Has Averaged Up Fairly Well—News Print Especially Shows Up Satisfactorily, Productions on the North American Continent in 1923 Making a New High Record—Fine Papers After Periods of Ups and Downs Have More Encouraging Outlook—Foreign Competition Disturbs Pulp and Wrapping.

Written Especially for the Annual Number by Talcott Williams Powell

The paper industry finds itself in a paradoxical position just now. Every man in the industry from the wood chopper to the jobber may be justly proud of progress that has been made within it since the last convention. Every man should face and seek to understand the influences that have come from without which have had anything but a good effect.

On the one hand it is evident that there is a tendency for more co-operation, greater service and fairer competition among the members of the paper industry. The six day week is coming to the board mills. There has been only one really disastrous price war and that has not been in the industry proper. The business has been established on a firmer basis probably than ever before with the leaders pointing the way by sound economic policies and the others following.

Influence of the European Situation

On the other hand the paper industry is suffering from the uncertainties of a seemingly hopeless situation in Europe and the foulest kind of politics at Washington. Along with other basic industries it has to deal with a lack of public confidence in the outlook for the future. The average man is developing that dangerous tendency to close his fist tight about his money and hang onto it until things clear up.

The first two or three months of 1923 found the industry in the midst of a baby boom which somewhat spent itself by the end of spring. Then came a summer which was only average in the amount of business done followed by a fall during which trading ran along pretty much the same until winter saw a decided change for the better. The new year opened well and business was just getting to a point where it was safe to predict an extraordinarily good year when the lid blew off Teapot Dome and a number of other things and everybody went to the show.

All of the big corporations with world wide influence realized that the domestic and foreign political situations were having an extremely bad effect on business and they took steps to remedy it. The Morgans loaned France an unlimited amount of cash, in spite of the fact that they knew that the country's credit was taxed to the utmost, not because they expected to make big money directly out of the transaction but because they knew that anything they could do to stabilize European conditions would help them eventually. The Guaranty Trust Company in a printed statement admitted that the commodity markets were unsettled owing to the political problem.

What Paper Manufacturers Are Facing

It might be well for the paper men to take account of just what he is facing. The Mellon Tax revision plan, from which every business man was hoping to gain great benefit, was rejected in favor of a less desirable substitute by the House of Representatives.

The approval of the bonus bill, while not unexpected, called attention to the possible expenditure of billions of dollars beginning almost immediately. The oil scandal has shaken the faith of people in those who guide the destinies of the nation. The sharp decline of the franc has given the exporters grave anxiety.

In the face of these uncertainties there is a general attitude of hesitation and unwillingness to make commitments for the future. Programs for expansion of old or the undertaking of new enterprises are held in abeyance and hand-to-mouth buying is becoming the rule of the day. Everyone is conservative. Everyone is cautious.

Then, too, the active advent of the one crop farmers of the northwest into politics has tended to delay measures which were necessary to the industries of the nation. Along with this has come the sinister bloc, or party within the party, which stands for class legislation and points directly to the breakdown of our present governmental system.

Before the business man gives his sympathy—and incidentally his money—wholly to the downtrodden farmer, let him take careful thought of just how deserving of sympathy the wheat grower is. He works at a liberal estimate about half of the year. The rest of the time he is reading the newspapers and wiring his congressman.

He is one of the worst gamblers known. He speculates with his crop and when he wins the people pay in added cost of flour. When he loses, which he has been doing frequently of late, he wails for help from the people through Congress. He has the advantage of the business man because he is in thorough organization.

These then are the problems with which the paper man has had to contend during the past year. They are so important that they must needs be included in any summation of the situation. The paper industry can fight these things only through strong co-operation and its members appear to be becoming more and more aware of this fact.

There is no reason for undue pessimism. In spite of an undoubtedly chaotic situation outside of the paper industry it is on a very firm basis from within. Many leaders in the trade say that so far as actual demand and supply goes things have never been more hopeful.

News Print Booms

News print has undoubtedly led the whole market during the entire year. More of it has been produced and consumed than ever in the past. The local market, to be sure, has undergone a distinct

Established 1886

Looking Both Ways

Some organizations look backward, because they have nothing to which they can look forward. Some look forward because they have nothing inspiring in retrospect. Some live only in the present because they have had no past and are apparently without any future.

For thirty-eight years, regardless of prosperity or depression, the business of M. Gottesman & Company has steadily increased. The most gratifying feature is the fact that most of our business is from customers who have been on our books more than a quarter of a century.

This has a definite meaning for every buyer of Bleached and Unbleached Sulphite, Kraft and Ground Wood Pulp. For in this age of keen competition, only leadership that is based upon the highest integrity, service, quality and fair dealing, could remain so long unchallenged. This organization recognizes in its past a clearly defined responsibility for the future. The high ideals and sound methods have and will be steadfastly maintained.

M. GOTTESMAN & COMPANY

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re allottment of large orders as a result of the activities of Frank Munsey, who has been responsible for the merging of three great dailies with a consequent pinch to certain news print producers and benefit to others.

Mr. Munsey's policy seems to be sound from the business standpoint at any rate since every merger has meant an increase rather than a decrease in the circulation of the combined newspaper. Thus there has been no loss in the total amount of newsprint consumed.

As a matter of fact every person in the United States is now using about fifty pounds of news print paper alone as compared with the fifteen pounds per capita in 1900. Thus it is to be seen at a mere glance that this commodity is continuing to grow from year to year without the slightest sign of diminution.

A Record Year

During the past twelve months the United States has consumed a total of 1,485,000 tons which is exactly 37,000 more than was used in 1922. Add to this the 1,263,000 tons produced in Canada, which is 181,000 more than the year before, and it is easy to predict that manufacturers of news print have nothing to fear in the future.

One of the most significant things about this set of statistics is the tremendous increase in Canadian production. When one realizes that a great deal of this was produced by capital from the United States for consumption here it seemingly becomes only a question of time before the whole news print industry moves north.

This movement began a number of years ago when it became evident that manufacturers were not going to get the right kind of co-operation from the government in keeping their mills here and also when the wise heads in the industry realized that wasteful methods of lumbering would soon use up most of the available standing pulpwood.

The future for the news print manufacturer seems to lie to the north and if the United States loses it no one is to blame but itself. It is a strange thing that the people should permit with complacence the removal of a basic industry but such seems to be the case and the tendency to build in Canada has perhaps been more pronounced this year than ever before.

Unsteady Year in Fine Papers

The increasing cost of rags and labor has been one of the outstanding problems with which the fine paper manufacturer has had to deal since the last convention. Fortunately the industry is in fairly good shape with a growing demand which does much to heal any of the old sores that may be rankling.

Like many of the other papers the fine grades had a slight boom during the first three months of 1923. This came to an end in April and from then until September the demand began to fall off until the reaction set in about the first of October.

This change for the better was so slight as to be almost unnoticeable at first but gradually the buyers seemed to regain confidence until the first snow found a revival of normal conditions once more. From January to April of this year there has been a normal healthy demand except during the past few weeks when the market showed some indications of uncertainty again.

High rag prices has brought about a metamorphosis in writing paper. Several years ago no one would have thought of using anything but a fine rag paper for really high class work. Now sulphite papers are having their day and the consumer is learning their value as he never has troubled to do before.

This is perhaps a fortunate condition of affairs since there would not be actually enough all rag bond or writing to supply the demand if the cheaper grade has not taken their place. Buyers would be fighting for the product, the price would go up and the market would be thrown out of plumb.

The increasing cost of labor is something that is not so easily met. In fact, there seems to be no remedy for this at present except for the manufacturer to split the increase with the consumer. In spite of this fact the outlook in general for fine papers seems to be fairly good unless something very untoward occurs to upset things.

Overproduction in Book and Tissue

In book and tissue the situation is not quite so hopeful. The old problem of over production is causing trouble although a tendency to consolidate smaller units of manufacture into the larger ones is doing something to ameliorate it. This gobbling of the smaller mills, while healthy for the industry as a whole, is always painful and disquieting. The small man makes a gallant fight with cut prices and running along at a loss but eventually he loses out and another unit disappears.

During the past twelve months this process has been going on and as a result the market has been a little more unstable than it should be. Eventually the absorption period will end and then the producers' may expect several prosperous years. No one can tell just when this will come about, but it is a long way off yet.

A glance at the production figures in book for the past year tends to prove that there has been a little more instability than there should have been. From January to February in 1923 the mills ran at full time with such a good demand that in March the price took a jump of five dollars a ton.

This was followed by an almost immediate adverse action on the part of the buyers who decided to cut down their orders to await a better figure. Through March, April and May the demand was only fair with a steady decline that in June forced the mills to go down to a basis of seventy-five per cent of full running time. All through the summer and the first part of the autumn book languished in disfavor and it was not until the first month of this year that it began to show real gain.

During the first six weeks of 1924 the buyers came into the market with increasing strength and the mills began to operate nearer and nearer capacity until last month they were going at a hundred per cent once more. This condition was not brought about by any boom, but by the fact that dealers had allowed their stocks to get so low that it was necessary for them to place some sizeable orders to get in shape to take care of their customers properly.

The Year in Board

Perhaps the most interesting commodity on the whole market during the past year has been board. There have been tremendous efforts from within to stabilize this branch of the paper market. Those who have been trying to do it have just about made up their minds that Hercules had a light job when he undertook to clear out the Augean stables.

Real progress has been made, however. There are a few outstanding figures in the board business who are determined to put it on a firm basis and they have given unsparingly of themselves to accomplish this. There has always been overproduction in the board industry also and the board men have tried one thing after another to remedy this each time coming nearer their goal.

One authority says that there has been a steady overproduction of twenty-five per cent ever since the days of Parks' Pool twenty years back. Early in the year the Armstrong Bureau sprang into prominence. For a time the board industry flourished like the green bay tree, but the Supreme Court of the United States ruled that it was operating in violation of the Sherman Anti-Trust Law and the bureau had to cease its activity.

Paper Exchange Has Brief Existence

Out of the debacle emerged the Paper Exchange—a genuinely good idea which had for its purpose the bringing together of all of the various branches of the industry for public trading under one roof. There was only one trouble with this and that was that, like John Brown, it was several years ahead of its time.

There had been too little time spent in ploughing and fertilizing the ground for the reception of this valuable seed. In consequence

IMPCO

CLOSED SYSTEM FOR GROUND WOOD PULP

"IMPCO" KNOTTER *(For First Screening)*
Over 500 in use on all kinds of stock

"IMPCO" CENTRIFUGAL SCREEN
Nearly 1000 in daily use

"IMPCO" TAILING SCREENER
Over 100 in use

"IMPCO" REFINER ~ ~ *New*
A Great Success

We develop our own machinery, know how to build it and make it give results in your mill
Correspondence a pleasure

IMPROVED PAPER MACHINERY CO.

NASHUA, NEW HAMPSHIRE, U.S.A.

Canadian Factory: Sherbrooke Machinery Co., Ltd, Sherbrooke, Quebec

it sprang up overnight and withered in a day. While it convinced the board industry that the idea was not workable at present it also convinced the entire paper industry of its ultimate workability and pointed the way for the next real forward step.

The board manufacturers then organized an association for carrying on the work both of the exchange and the Armstrong Bureau in a somewhat modified form. As soon as it really got limbered up for smooth running the late Mr. Daugherty, who is now licking his wounds in seclusion, propounded his obviously nonsensical syllogism that all trade associations were illegal.

This weighty declaration from the recent solon of the Department of Justice had little effect on the older trade associations who had been operating for years in a manner which had been proved legal and they simply continued to do so. It did give a set back to the new board organization. Its members were a little inclined to nerves as a result of frequent crossing of swords with that same Mr. Daugherty.

There is every reason to believe at present, however, that the association is rapidly gaining in power. The Sunday work in the mills has been practically abolished and there is a greater tendency toward co-operation among the board men which is a good omen for the future.

Coarse Papers Have Poor Year

Coarse papers started out strong in 1923 and continued in good demand until early summer when there was a decided falling off. With the beginning of 1924 the market became even more discouraging and leading members of the industry made up their minds that there was a very definite over production.

One coarse paper man remarked that 2,000 tons were being produced for every 1,500 consumed. There have been definite efforts to stabilize the market. One group of mills in the South raised prices, but most of them have not held to the higher schedule. As a matter of fact there are many sales being made at prices far below market quotations and at a level at which no mill can afford to do business.

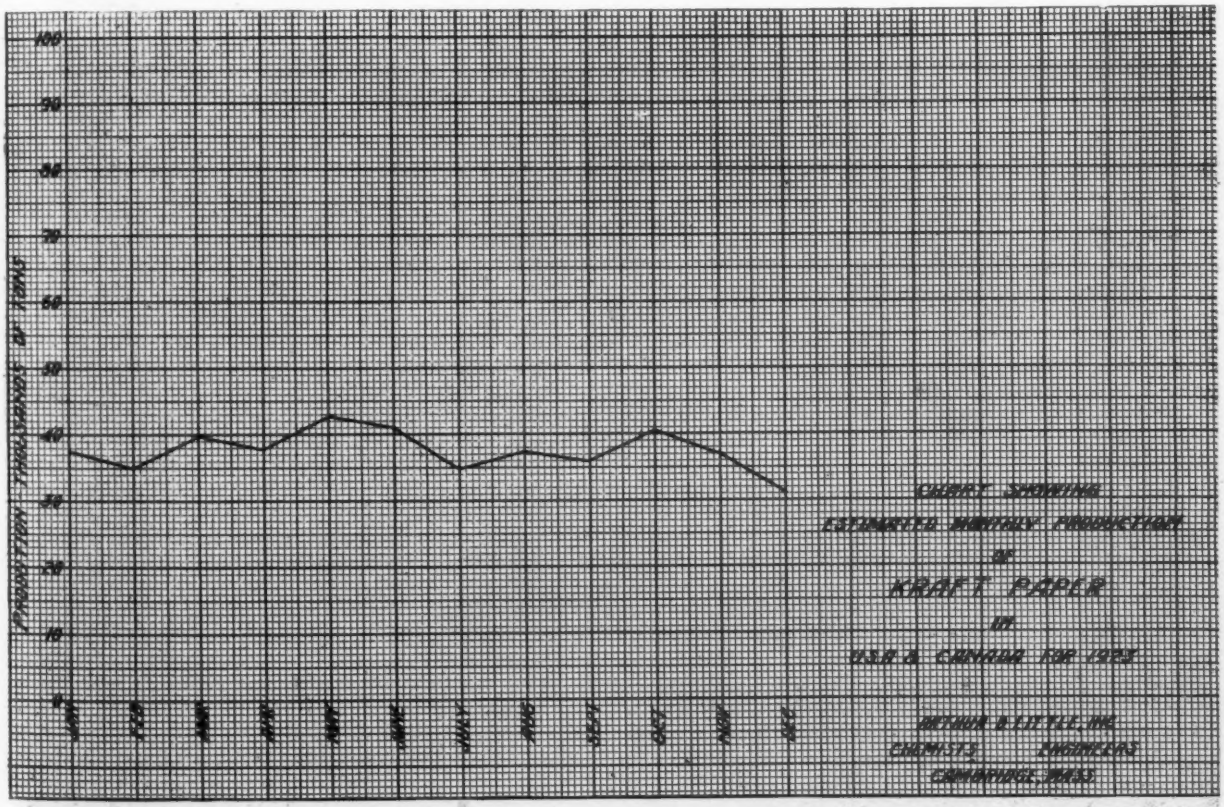
Of course, this is the beginning of the end. When manufacturers begin to do this sort of thing they become automatically eliminated from competition in the end. That is all that is the matter with the coarse paper market—too much competition.

The far seeing ones in the trade say that this branch of the business is bound to improve since it is now down pretty close to rock bottom. They say that this improvement may not come for a few months, but that before next year begins it will be much better.

Stormy Year in Pulps

The pulps have had a stormy year, but they appear to be pulling out of the rough water at last. The keynote of the situation has been really on the other side of the Atlantic. The Scandinavian mills have put up some stiff competition with the domestic and time and time again the paper manufacturer has been able to buy Swedish pulp delivered at his door for less money than he could buy the domestic commodity from a mill only a hundred miles away.

Mechanical pulp is, of course, always in a class by itself. The demand for this has been good and it has not had to fight imported pulp. Only during the summer when extremely low water caused a good deal of anxiety was there any really strained situation in



Estimated Monthly Production of Kraft Paper in the United States and Canada During 1923. Prepared by Arthur D. Little, Inc., Cambridge, Mass.

this market. The steady demand for news print has done much to keep this market in a stable condition and it has run along through the past twelve months with a steady call for it and a good price.

In the chemical pulps heavy imports began late in 1922 in kraft and unbleached sulphite. The other grades began to come piling in a few months later. This caused a number of resales below the market price and considerably upset public confidence causing a very ragged market.

Then Sweden began to have strikes and as a result a certain amount of foreign production was lost forever. This stimulated the domestic market for a time, but when the Scandinavian mills began to operate once more they were so anxious to make sales that they came into the local markets at very low prices throwing things up in the air. Frequent shutdowns of the domestic mills also helped to make a bad situation worse. The past few weeks have seen a decided improvement and there is every reason to believe that this is going to continue.

Paper Makers Chemicals

The year in papermaker's chemicals has also had its ups and downs, but now seems to be on the way to a steady market. Dealers on the whole are fairly satisfied with the amount of business they have done although it is not quite so large as they had hoped.

The latter part of 1922 and the first of 1923 were particularly good. As the year wore on, however, prices and production decreased to meet the demand until the summer found things quite dull. Casein was probably the most uncertain of all of the articles on this market while saltcake and china clay were the steadies. At present there is a good demand which is growing better gradually and will probably continue.

INTERNATIONAL PAPER HAS GOOD YEAR

The International Paper Company reports operating revenues of $8,074,577 for 1923, against an operating loss of $1,047,128 in 1922. After reserves for depreciation, Federal taxes and interest the company reported net income of $3,809,540. This, after preferred dividends, was equal to $11.59 a share earned on the $19,931,984 common stock outstanding at the close of 1923. After reserves for depreciation, inventory adjustments and other deductions the company reported a loss of $7,572,390 in 1922. The surplus after dividends in 1923 amounted to $2,309,540, while in the previous year the company reported a deficit of $9,072,390 after preferred dividends. The profit and loss surplus on Dec. 31, 1923, amounted to $17,112,330, against $14,802,790 at the close of 1922.

The general balance sheet on December 31, 1923, showed net current assets of $31,247,972, against net current liabilities of $14,605,766, leaving the company working capital of $16,642,206.

Commenting upon the paper situation of the country, Philip T. Dodge, president, in a statement to stockholders, said:

"There were produced by the company during the year 537,927 tons of paper—the largest production in its history, and double that of any other producer in the world. Of this amount 352,518 tons were news print and the balance higher grade paper of various classes.

"The consumption of news print paper in the United States in 1923 was greater than in any previous year by 13 per cent, being substantially 2,800,000 tons, of which 2,600,000 tons were produced in North America and the balance imported from European countries. The production in the United States was 1,485,000 tons.

"At the present time the company and its subsidiaries own in fee in the United States and Canada 1,639,000 acres of timber lands, and also control 2,875,000 acres of crown and leased lands."

AIRPLANE VIEW OF THE PLANT OF THE WAYAGAMACK PULP AND PAPER CO., THREE RIVERS, QUE., THE LARGEST KRAFT MILL IN THE WORLD.

News Print Makes New Record Year

Production Last Year on North American Continent Is 2,824,000—Total for the United States and Canada Surpasses by 218,000 Tons or Nearly 9 Per Cent the Previous High Mark of 2,530,000 Tons in 1922—Imports of News Print for 1923 Amount to 200,000 Tons as Compared With 133,000 in 1922—Continued Expansion of the Industry Influenced by Big Growth in Newspapers.

Written Especially for the Annual Number of the Paper Trade Journal by R. S. Kellogg, Sec., News Print Service Bureau

The production of news print paper in North America hung up a new record in 1923, the total for the United States and Canada surpassing by 218,000 tons or nearly nine per cent the previous high mark of 2,530,000 tons in 1922.

1,485,000 Tons Produced in U. S.

The United States mills produced 1,485,000 tons of news print or 37,000 tons more than in 1922 and also more than any previous year except 1920 when the total was 1,512,000 tons. In 1920, however, the output of the regular news print mills in the United States was supplemented by perhaps 80,000 tons from the so-called marginal mills, which have not contributed so heavily to the news print supply since that time of abnormally high prices.

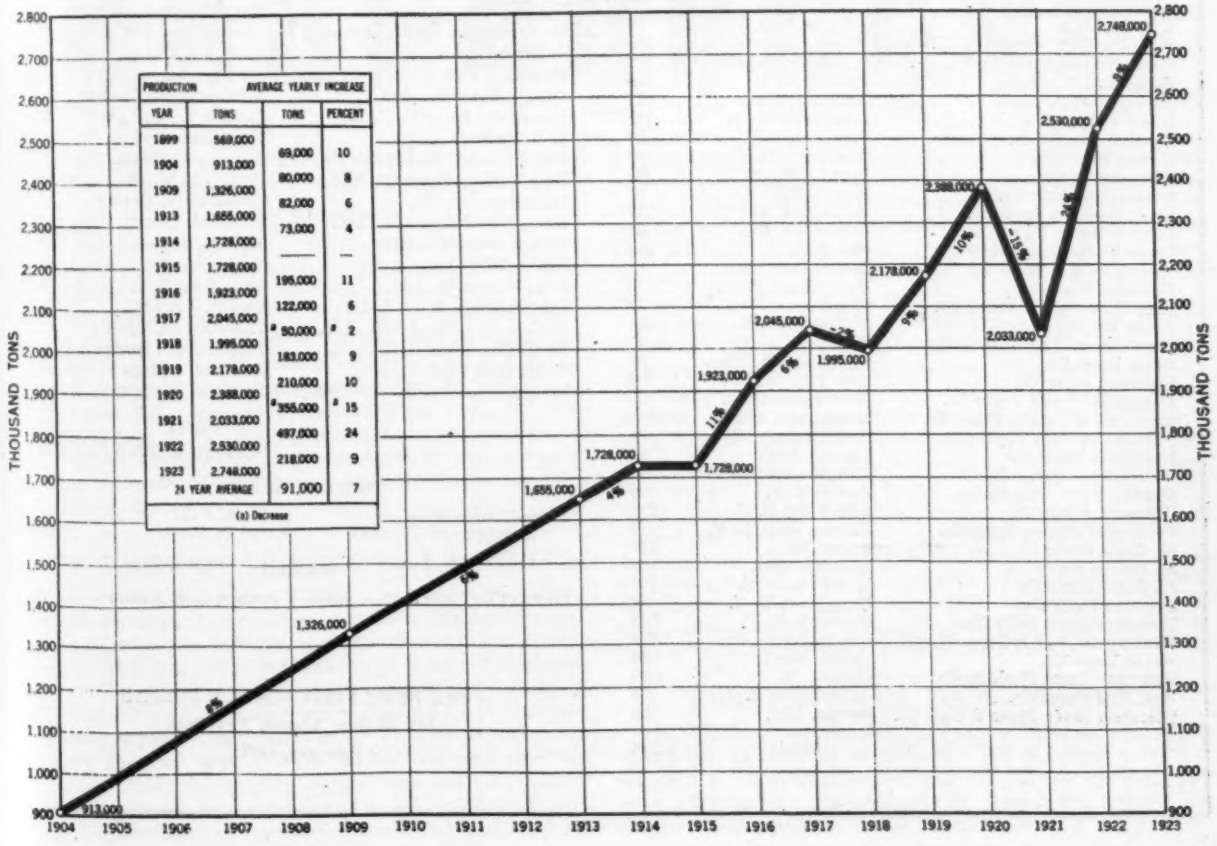
The rapid development of news print manufacture in Canada is strikingly shown by the fact that the output last year was 1,263,000 tons or 181,000 tons more than in 1922 and 455,000 tons, or 56 per cent, more than in 1921.

2,824,000 Tons Made in North America

In addition to these totals for the United States and Canada, 64,000 tons of news print was produced in Newfoundland and 12,000 tons in the one mill in Mexico which makes news print, thus giving a production of 2,824,000 tons for the North American Continent, or 60 per cent of all the news print paper produced in the world.

In addition to this record-breaking production, with 88 per cent of Canada's news print marketed in the United States, some 200,000

NEWS PRINT PRODUCTION
U. S. AND CANADA



PRODUCTION		AVERAGE YEARLY INCREASE	
YEAR	TONS	TONS	PERCENT
1899	569,000		
1904	913,000	69,000	10
1909	1,326,000	80,000	8
1913	1,655,000	82,000	6
1914	1,728,000	73,000	4
1915	1,728,000	——	—
1916	1,923,000	195,000	11
1917	2,045,000	122,000	6
1918	1,995,000	(a) 50,000	(a) 2
1919	2,178,000	183,000	9
1920	2,388,000	210,000	10
1921	2,033,000	(a) 355,000	(a) 15
1922	2,530,000	497,000	24
1923	2,748,000	218,000	9
24 YEAR AVERAGE		91,000	7

(a) Decrease

tons of Scandinavian, German and Finnish news print paper was sent to the publishers in Uncle Sam's domain in 1923, compared with 133,000 tons in 1922 and 135,000 tons in 1921.

15 Per Cent More Made Than in 1922

As the production figures suggest, the consumption of news print paper in the United States reached a new high record in 1923. In round numbers it was 15 per cent more than in 1922 and 28 per cent more than in 1920.

Adding imports to domestic production and deducting the small amount of exports, there was 50 lbs. per capita of news print paper available for consumption in the United States in 1923 compared with 15 lbs. in 1900. This increase of 230 per cent in per capital consumption in 23 years explains why the United States uses more news print paper than all the other countries of the world combined.

Larger Size Newspapers

Advertising as usual was an important factor in determining the quantity of news print used in 1923, but influential also were the large sizes of the daily and Sunday issues and the growth in circulation. There are some 60 newspapers in the United States each having a circulation in excess of 100,000 copies. During 1923 these dailies averaged 27 pages and the Sunday issues 101 pages—sizes never before attained.

Big Growth in Newspapers

There are more than 22,000 newspapers in the United States and Canada of which some 18,000 are monthlies and country weeklies, while the circulation of the 2,000-odd English language dailies is approximately 31,000,000 for the week-day issues and 21,000,000 for the Sunday issues. A well-known newspaper has increased in circulation from 93,000 copies to 584,000 copies of its daily issues since 1903 and from 196,000 copies to 932,000 copies for the Sunday issues in the past 20 years, and this is by no means an isolated example of newspaper growth. There is now a copy of a daily paper published for every family in the United States and Canada. The daily newspaper habit is well-nigh universal north of the Rio Grande.

Advertising Greatly Increases

The total volume of newspaper advertising in the leading cities of the United States showed an increase in 1923 over 1922 of seven per cent and of one per cent over the 1920 record figure. The newspapers fared even better than the magazines in the advertising field, since the volume of advertising in the national periodicals was 19 per cent more in 1923 than in 1922 but still 21 per cent behind the 1920 total.

The large volume of advertising, both periodical and newspaper, planned for and to be expected during 1924 is a matter of common knowledge. It looks as if the time were not far distant when the

NEWS PRINT MILLS IN NORTH AMERICA

UNITED STATES

Company	Head office	Capacity
Alexandria Paper Co.	Alexandria, Ind.	40
Algonquin Paper Co.	Ogdensburg, N. Y.	80
Arrowhead Mills, Inc.	Fulton, N. Y.	21
Cliff Paper Co.	Niagara Falls, N. Y.	38
Consolidated Water Power & Paper Co.	Wisconsin Rapids, Wis.	250
Crown-Willamette Paper Co.	San Francisco, Cal.	392
De Grasse Paper Co.	Pyrites, N. Y.	176
Escanaba Paper Co.	Escanaba, Mich.	117
Finch, Pruyn & Co.	Glens Falls, N. Y.	133
Flambeau Paper Co.	Park Falls, Wis.	25
Gilman Paper Co.	New York, N. Y.	48
Gould Paper Co.	Lyons Falls, N. Y.	94
Grandfather Falls Co.	Merrill, Wis.	33
Great Northern Paper Co.	Millinocket, Me.	737
Great Western Paper Co.	Ladysmith, Wis.	58
Hanna Paper Corporation	New York, N. Y.	194
Hawley Pulp & Paper Co.	Oregon City, Ore.	26
Hennepin Paper Co.	Minneapolis, Minn.	35
High Falls Pulp & Paper Co.	Chateaugay, N. Y.	25
Inland Empire Paper Co.	Millwood, Wash.	94
International Paper Co.	New York, N. Y.	1041
Itasca Paper Co.	Grand Rapids, Minn.	54
Kennebec Paper Co.	New York, N. Y.	55
Manistique Pulp & Paper Co.	Minneapolis, Minn.	63
Minnesota & Ontario Paper Co.	Minneapolis, Minn.	244
Nekoosa-Edwards Paper Co.	Port Edwards, Wis.	33
Northwest Paper Co.	Cloquet, Minn.	43
Oswegatchie Paper Co.	Natural Dam., N. Y.	46
Oswego Falls Corporation	Fulton, N. Y.	35
Pejepscot Paper Co.	New York, N. Y.	123
Pettebone-Cataract Paper Co.	Niagara Falls, N. Y.	27
St. Croix Paper Co.	Boston, Mass.	177
St. George Paper Co.	Norwalk, Conn.	31
St. Regis Paper Co.	New York, N. Y.	172
Sherman Paper Co.	Watertown, N. Y.	52
Tidewater Paper Mills Co.	Brooklyn, N. Y.	103
Washington Pulp & Paper Corp.	San Francisco, Cal.	130
Watab Paper Co.	Sartell, Minn.	27
Waterway Paper Products Co.	Chicago, Ill.	38
West End Paper Co.	Carthage, N. Y.	34
Wisconsin River Paper & Pulp Co.	Neenah, Wis.	68
	Total	5,212

CANADA

Company	Head office	Capacity
Abitibi Power & Paper Co., Ltd.	Montreal, Canada	483
Backus-Brooks Co., Ltd.	Kenora, Ont.	100
Bathurst Company, Ltd.	Bathurst, N. B., Can.	55
Belgo Canadian Paper Company, Ltd.	Shawinigan Falls, Quebec	372
J. R. Booth, Ltd.	Ottawa, Ontario	156
Brompton Pulp & Paper Co., Ltd.	East Angus, Quebec	113
Canada Paper Co. Ltd.	Windsor Mills, Quebec	42
Donnacona Paper Co., Ltd.	Donnacona, Quebec	214
E. B. Eddy Co., Ltd.	Hull, Quebec	60
Fort Francis Pulp & Paper Co., Ltd.	Minneapolis, Minn.	142
Fort William Paper Co., Ltd.	Fort William, Ont.	136
Laurentide Co., Ltd.	Grand Mere, Quebec	380
News Pulp & Paper Co., Ltd.	Montreal, Canada	32
Ontario Paper Co., Ltd.	Thorold, Ontario	296
Pacific Mills, Ltd.	Vancouver, B. C.	236
Powell River Co., Ltd.	Vancouver, B. C.	250
Price Brothers & Co., Ltd.	Quebec, Canada	440
St. Lawrence Paper Mills, Ltd.	Three Rivers, Quebec	115
St. Maurice Lumber Co., Ltd.	Three Rivers, Quebec	303
St. Maurice Paper Co., Ltd.	Montreal, Canada	123
Spanish River Pulp & Paper Mills, Ltd.	Sault Ste. Marie, Ont.	690
	Total	4,738
	Grand Total, U.S. & Can.	9,950

NEWFOUNDLAND

Anglo-Newfoundland Development Co., Ltd.	Grand Falls N. F.	217

MEXICO

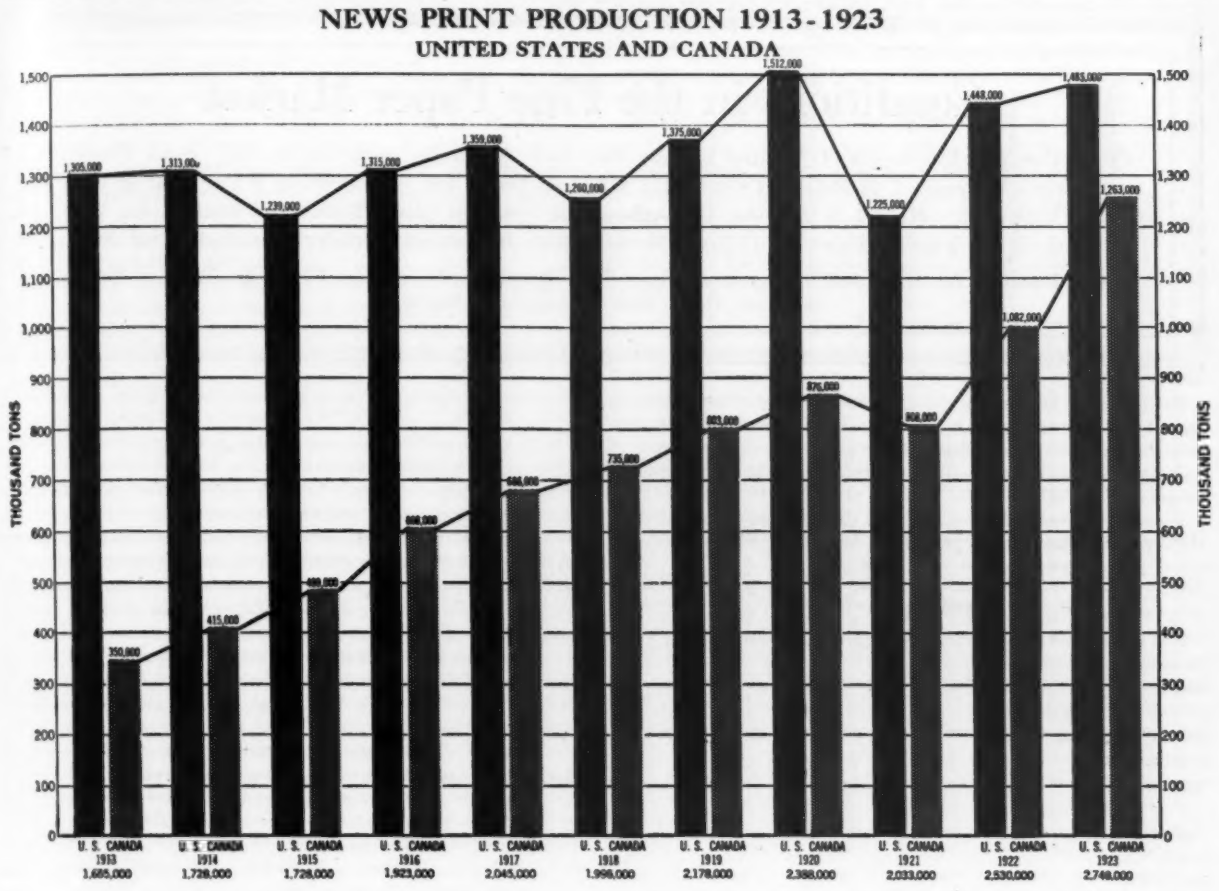
Fabricas De Papel De San Rafael Y Anexas, S. A. Mexico	50

Compiled by

THE NEWS PRINT SERVICE BUREAU

342 Madison Avenue, New York

February, 1924



total yearly expenditure for advertising by means of the printed page in North America would be one billion dollars.

Continued Expansion

Paper manufacturing in North America is a billion and a half dollar industry with the production of news print making up a very respectable proportion of the total investment and further notable developments under way. There were 10 new machines with a total daily capacity of 670 tons which came into production in 1923, and four more of 385 tons capacity have come in this year. The North American news print mills now have a rated capacity of 10,000 tons daily with further substantial additions under way for the latter part of the year and for 1925, so that there should be no need for any newspaper publisher in North America to go abroad for his supply of white paper. The charts reproduced herewith tell their own story.

A. P. W. PAPER CO. TO BUILD MILL IN CANADA

A contract for the erection of the pulp mill of the Albany Perforated Wrapping Paper Company, at Sheet Harbor, was concluded in Halifax on Saturday with the Parsons-Ed Company, Limited, of Moncton, and actual construction work will begin this week, J. F. Parsons, who negotiated the contract for his company, stated. The A. P. W. Company was represented by W. S. Crandell, general manager, and Seth Wheeler, Jr., vice president, who spent three days last week at Sheet Harbor, and who leave this morning for Albany, N. Y. The contract price was not disclosed.

The building contracted for on Saturday will be 185 by 72 feet, and will be constructed of reinforced concrete and brick. All the material that can be procured for the building in Nova Scotia will be purchased in the province, Mr. Parsons stated, and local labor will be employed to the fullest possible extent throughout the construction work, he said. About 150,000 brick will be required, and these will come from Pugwash. This week a number of men will be put to work and the force employed in the erection of the building will average between forty and fifty men.

The contract stipulates that the building shall be completed by August 1st, this year, and the record of the Parsons-Ed Company indicates that it will be ready on time. This concern built the Municipal Home at Mabou, which was opened in January, and the principals before forming the existing company, which has been doing business about two years, had charge of the construction of the huge T. Eaton building at Moncton. They are now engaged on a storage warehouse in St. John.

The machinery for the Sheet Harbor pulp mill has all been ordered for delivery not later than next June, Mr. Crandall said, and as soon as the Nova Scotia Power Commission is ready to deliver the power for which the company has contracted, the mill will start production. This mill will have a production of 100 tons of ground wood pulp per day and a large portion of this pulp will be shipped via water to their paper mills in Albany, N. Y.

SUPERIOR PAPER CO. TO BE SOLD

The Superior Paper Company, of Franklin, Ohio, is entering into negotiations for the sale of its plant. The equipment consists of six beating and refining engines and one 140-inch cylinder, trimming 123½ inches. The production is tissue toilet, toweling and napkins, about 24,000 lbs. per 24 hours.

Conditions in the Fine Paper Market

Production and Shipments of Writing for the Past Year About the Same as in 1922—Book Production Shows Increase of 10 Per Cent Over 1922 Whereas Tissue for 1923 Declines 8 Per Cent as Compared With 1922—Market Is Restless Throughout the Year but Closes With Good Outlook for Writing and Cover Paper—Book and Tissue Markets Also Improving—Steady Consumption of Book.

Written Especially for the Annual Number of the Paper Trade Journal by Emmett Hay Naylor, Sec.-Treas. of Writing, Cover and Tissue Paper Manufacturers Association.

By fine paper is meant writing, book, cover and tissue papers in their various forms and grades. The history over the last year shows a very even condition as regards production and shipments of writing papers which were only 1 per cent above the production and shipments for 1922.

Book paper production in 1923 was 10 per cent higher than in 1922, whereas tissue paper production for 1923 declined 8 per cent below the previous year.

Ups and Downs of 1923

But the market was rather restless throughout the year. From January to March there was a slight boom in demand and an increase in cost. From April to June the demand for new orders declined, but shipments remained about normal. From July to September a reaction set in. There was a further curtailment of orders and the price of pulp declined. From September to November there was a mild revival and in December there was the seasonal reaction, with only an average demand and rags increasing in price. From January to April there has been a healthy, normal revival.

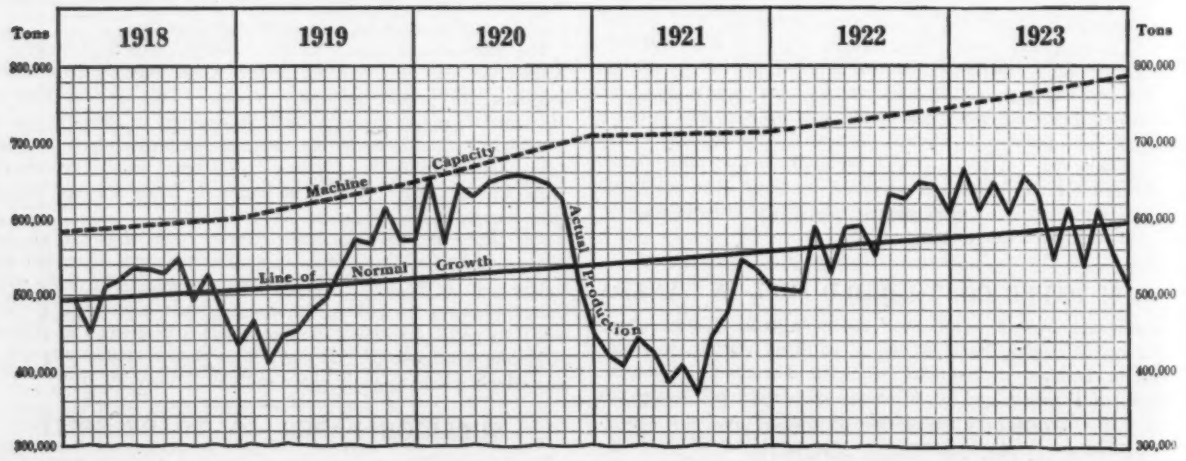
During the latter half of 1923 the printers' stocks have not been normal, and the merchants' stocks have not been kept as high as the demand would normally require. But there has been a general realining of stocks and methods of distribution, and the entire market has been purged of those unhealthy relative conditions which grew up during the war and immediately thereafter.

The book paper and tissue paper markets, however, from a manufacturer's standpoint, are in a less desirable condition due primarily to overproduction resulting from excessive productive capacity.

However, there is an interesting change taking place in the tissue paper market which is quite analogous to that which has taken place in the book paper market. In book paper fifteen years ago there was a decided trend of contracts for book paper to the large producing mills. These mills with their more available capital and hence larger and more modern units of production, gradually took over practically all of the contract book business, leaving the production of book paper for the general trade to the so-called "smaller book mills." Those smaller book mills expanded considerably during the war, as did the larger mills, but the latter were in a stronger financial condition to weather the depression of 1921, whereas the smaller book mills have had difficulty, bringing about consolidations in certain instances.

Among the tissue paper manufacturers making toilet and towel papers, the same thing is taking place. There is a marked trend of the production of toilet and towel papers towards the larger companies who have increased their plants considerably and have better methods of production and national distribution. The smaller companies will always have a place to fill, but competition among them is becoming more and more acute.

The larger plants are able to sell toilet and towel papers at a lower cost because of their large production, with a result that the smaller manufacturers, in order to get any kind of business, have had to cut their profits down to practically nothing. The larger



ACTUAL PAPER PRODUCTION (all grades) COMPARED WITH NORMAL GROWTH AND MACHINE CAPACITY.

The dotted line indicating the capacity of the country's paper machines shows why, even with normal production, the manufacturer does not find business as good as he should like it to be. The spread between the normal growth line and the machine capacity line, which is the amount of over-capacity in the paper industry, will continue to be the chief source of difficulty that so often makes for poor business conditions. The line of normal growth of consumption will steadily advance to meet the country's capacity in five to six years provided new machines are not added promiscuously to the already over-equipped industry.

mills have met this competition, which has brought about a most depressed condition in the market.

The Industry Is Overequipped

In the five years ending 1924, 193 new papermaking machines with a stated daily capacity of 8,107 tons will have been installed.

Production has increased one million tons in five years, which has been the rate of normal growth during the last twenty-five years. The addition of new machines less the capacity that has been dismantled or has otherwise become obsolete has added 1,825,000 tons in the last five years, and it must be remembered that the industry was overbuilt in 1919.

Although no increase in the rate of growth of consumption is apparent, the installation of new machines has greatly exceeded the pre-war normal growth, as is illustrated by the following:

	Capacity Tons	Production Tons
1919	7,671,000	6,190,300
1924	9,519,800	7,200,000

The present overcapacity is more than one million tons.

An examination of the statistics of new machines shows that, even after the tremendous expansion of new machines in 1920, if the installation of new machines had then been stopped, production by 1924 would have been able to absorb practically all of the country's capacity and we would have market conditions, as represented by relative supply and demand, equally as good as the condition existing the early part of 1920.

It will take five to six years for normal consumptive requirements and growth to absorb the product which the existing machines can make under normal conditions. This does not mean running absolutely full, but 85 to 90 per cent.

The writing paper market has at times been materially affected by the divergence of some book and news print machines to the manufacture of the cheaper grades of writing paper. In the writing paper market there has been a decided increase in the use of all sulphite papers which have a very definite function in our business world. The rag content and all rag papers have held their own, but have not increased in tonnage each year, but there is a swing back now to the rag content and all rag papers for the particular purposes for which they are best adapted.

Costs

The cost of making fine paper has not declined as much as the cost of making coarse papers. There has been a decline in the price of sulphite pulp which has been reflected in the price of paper. Sulphite pulp prices have been fairly firm over the past six months and there is no indication at present of their being any lower. The paper markets consequently have reflected this stability.

Manufacturers of rag content papers, however, are facing a serious situation in the enormous and continued increase in rag prices. High-priced cotton, due to the shortest cotton carry-over in our history, has lowered cotton consumption here and abroad.

In Europe the large stocks of cotton rags during and immediately after the war have been used up, and the shortage is as acute on the other side as it is here. Consumption of clothing is low, and consequently the usual supply of cotton rags is not in evidence. In addition to this, shreddy and shoddy manufacturers in this country, because of high-priced cotton, are using and buying more rags at prices higher than paper mills can afford to pay. All of these factors attempt to diminish the supply of cotton rags and advance their prices.

The cost of labor, which represents about 85 per cent of the cost of making paper, from the tree or the rag-picker to the finished article, has not declined enough to be reflected in the price of fine papers. The mill workers are getting at the present time 132 per cent more wages than they did in 1914, and there are no indications that these wages can be materially lowered for a considerable while, and even then, it is felt, in order to make the industry attractive for younger men to become skilled paper makers, that wages will always have to be relatively higher than they were in 1914.

The fact of the matter is that in making comparisons of prices, wages, volume of production, it is of doubtful value to go back to conditions of 1914.

Owing to general world readjustments, our growing population, our increasing consumption and wealth, it is very evident that the economic basis for comparisons are not readily found in pre-war conditions. It is felt by many economists that 1923 was in fact a normal year and that it is likely that in the near future 1923 will be taken as the new basis for comparison of prices, volume of production, etc., the same as has been the tendency over the last decade to make comparisons with 1914.

The Outlook

The outlook for the writing paper market is exceedingly good. Fundamental conditions are sound and there is an increasing demand for these papers in all various forms of printing and for other business purposes.

Cover paper is in a flourishing condition, increasing steadily in demand due to the large direct-by-mail and catalogue business.

Tissue paper is finding an increase in growth in sanitary papers, folded towels and in tissues for wrapping and waxing purposes, as well as a number of new specialties which have come on the market.

The growth in consumption of book paper is steady owing to the large increase in magazine advertising since the war, which it would seem has become permanent. Magazine advertising in the first quarter of 1924 was the highest in the last four years.

Therefore, although the book and tissue paper markets are not in an attractive condition at the present time, they are gradually working towards a better and more prosperous condition, providing their productive capacity is not materially increased and the present overproduction is allowed to take care of the increasing demand.

PROTEST TAX MEASURE

Warren B. Bullock, of the American Paper and Pulp Association, filed a letter with the Finance Committee of the Senate at Washington on behalf of the Association in connection with the income taxation of distributions of surplus. The communication is as follows:

"WHEREAS, the paper industry of the United States, using as it does the products of timberlands in the manufacture of 95 per cent of all the paper manufactured, has invested from its undistributed earnings in the years prior to 1913 considerable sums in timberlands, as well as in plant equipment, and

"WHEREAS, the cutting of such timber, and the manufacture of forest products into the finished product involves the liquidation of the surplus which has been invested, Therefore, Be it

"RESOLVED, That the American Paper and Pulp Association, the central organization of the paper industry of the United States, believes that the enactment of proposed legislation, in Section 201 (b) and (c) for the income taxation of distributions to shareholders of surplus (including earnings of profits accumulated, or increase in value of property accrued before March 1, 1913) and the original capital investment would constitute an unjust penalty on that manufacturer or corporation which had shown sufficient foresight to establish a reserve of raw material for future consumption in its mills."

PAPER APPEAL TO BE HEARD IN OCTOBER

It is understood at Washington that the appeal of the Pacific Coast States Paper Trade Association to the Circuit Court in California against portions of the cease and desist order of the Federal Trade Commission will not be heard until the October term of court. The date for the argument has not been set but information reaching the Trade Commission is to the effect that the case will go over until the autumn.

Situation in the Board Industry in 1923

Constructive Developments Include Closing of Mills on Sunday and Working Only Six Days Per Week—Great Obstacle, However, in the Way of Progress Is Fear of Many in the Industry to Join in Up-to-Date Movements—This Was Responsible for Winding up Last Year of the Paper Industries Exchange—Over Production in the Industry and Market Demoralized—Some of the Causes.

Written Especially for the Annual Number of the Paper Trade Journal by George W. Gair, Vice-Pres. Robert Gair Co.

The box board situation during 1923 was a peculiar combination of selfishness and unselfishness mixed up with the Armstrong Bureau, which represented the unselfish group and which, fortunately, was in the majority. This group, recognizing the benefits of organization and co-operation, developed as one of its principles that Sunday labor in the mills should be abolished, and as this was made necessary by six-day operation, a large number of the mills agreed to run only five days a week and do the necessary repair and maintenance work on Saturday.

A Timely and Decent Reform

This was sincere. There was no camouflage about it—it was a timely and decent reform in working conditions, and while it resulted in the curtailment of operating time by one day, and helped to take up the slack in overproduction which the industry has suffered from, it was all done in the open in manly fashion. Publicity was given to the move, hoping that it might become general throughout the entire industry, which would have been the finest thing that could have happened, and it would have succeeded if all mill owners were built on broad enough lines to see the advantage of adopting such decent operating methods in their plants.

The great obstacle in getting anything of a constructive nature accepted by the board mills generally is fear, many of them harking back twenty years to the days of the Parks' Pool. Both those who are inclined to support reform ideas and those who are not, are fearful of joining in any good, progressive movement, notwithstanding the conspicuous record of the twenty years that have elapsed since then, which show that there has been an overcapacity of fully twenty-five per cent that stands as a barrier to the prosperity of the industry and is a menace to it.

Developed Dependable Statistics

The Armstrong plan developed statistics that were dependable and promptly available, which served as a guide in directing the business, which is just as necessary to the manager of a paper board mill as the chart and compass is to the captain of an ocean-going steamship. But most mills have been run without a chart and compass for so long, they do not know how to make use of such instruments or are afraid to band together in developing them.

I claim we have just as much right to do this as to agree upon daylight saving or use the reports of a credit agency for determining to whom credit can be given.

The Government's debts must be met from taxes upon the industries of the country. Industries cannot pay taxes unless they are conducted profitably, and the box board industry is one of the important ones of the country. If the Government menaces the earning power of an industry by preventing reasonable co-operation and the developing of information relating to it that should serve as a guide for its operations, then there is no hope of income from that source, either for the Government or those engaged in the industry.

Innocent of Wrong Doing

It has been said that the Government views the work of an association, not so much by what it does as by the results of its operation, measured in the income of its members. If this is the correct version, then the box board industry, over a period of twenty years, is as innocent of any wrong doing as a babe unborn, for the record of earnings of the entire group is all that is needed to prove that there could have been nothing of a nature to be questioned by either the Federal Trade Commission or the Department of Justice.

It was fear that disrupted the Paper Industries Exchange, which was launched last year to take the place of the Armstrong Bureau. This permitted price determination in the open, buyer and seller having equal access both to the market and the figures that resulted from it. If it had been carried through successfully it would undoubtedly have cured many of the evils we are suffering from, but the combination of divergent legal opinions and that same fear brought about its collapse.

Overproduction and Demoralized Market

And now what have we? A Box Board Association, national in scope and based on the simplest lines possible to develop information relating solely to supply and demand, giving production figures only. And fear again prevents giving the support to the movement that is necessary for its success, and the result is a demoralized market, way over produced, in which no one is making any money and most companies actually taking losses.

This is the condition at the beginning of 1924, with trade conditions generally pretty fair and the demand for box board fair, if not good. What the result will be later on is hard to predict, but until the industry is in stronger hands, or the Government clears up the situation by stating what can be done legally by co-operative effort, there is little hope for betterment.

Mr. McBain's Views Fit the Case

The article of B. T. McBain, entitled "Waste in Pulp and Paper Industry," fits the case better than anything I have read in a long time and is worth repeating here for the benefit of those who have not already seen it:

"Why is it the laws are such that a man growing peaches or prunes may join an association of like growers and pool his crop to the best advantage as to sale, while a man growing spruce trees cannot do likewise?

"Why is it that a man producing apples may combine to secure a living price for his product, but the man producing bricks cannot do so? Why is it that one American citizen producing what each and every other American citizen needs for food can, under the law, produce an article in combination with other like producers and charge the whole consuming public a price that will allow of a living wage to be paid his employees and have a decent return on his investment, while people in other lines of endeavor dealing with

only a few, comparatively speaking, must submit to ruinous competition and be forced to shut down his plant to the end that he cannot pay his employees a living wage and cannot have a decent return on his investment?

"Why? Politics is the answer, in my opinion.

"I believe it is right that the food producer should be protected and should be allowed to co-operate with his competitors. I believe further that all other legitimate producers should be protected and should be allowed under proper supervision to co-operate with his competitors in exactly the same way.

"Our American constitution guarantees equal rights to our citizens, but in this particular case our laws are not allowing equal rights.

"I cannot see why, when cut-throat competition is on, one of the producers cannot be allowed to go to all the others and say, 'Gentlemen, we cannot live under this kind of competition. We should agree not to cut prices further and get this market back onto its feet, to encourage the buyers and get them to have confidence, to the end that we can all of us at least live.' Then say further that we should each one send to our customers a letter that we will not cut prices further for the next quarter.

"But, as the law now stands, we are not allowed to do this. We are not allowed to talk prices or to combine in restraint of trade; while an agreement of this kind, while the market is all upset, would not be in restraint of trade, but a help, a life belt when things are sinking and some are about to drown in the sea of cut-throat competition that is not, and cannot ever be, considered legitimate.

"Why not put up our case in the strongest possible way and apply to the powers that be, for a hearing to the end that we may all live?

"As it is, when unfair competition comes, who gains? No one. Who loses? Everyone, but particularly that important part of our citizenship, the so-called common people, the workingman.

"A shutdown, though a man may be paid a living wage when working, soon brings the wolf to the door of many homes. Ruinous competition brings nothing short of shutdown and loss.

"Why? Politics and Waste."

CONDITIONS IN THE BOOK PAPER INDUSTRY IN 1923

Written Especially for the Annual Number of the Paper Trade Journal

During January and February, 1923, the book mills were operating full and there was an increasing demand for all grades of paper manufactured by what is known as the book paper mills, including such as publications, standard magazines, trade papers, tablet and envelope papers. This steady demand caused some advances in raw materials and labor, so that about March 1 there was a general advance in prices of about $5.00 a ton.

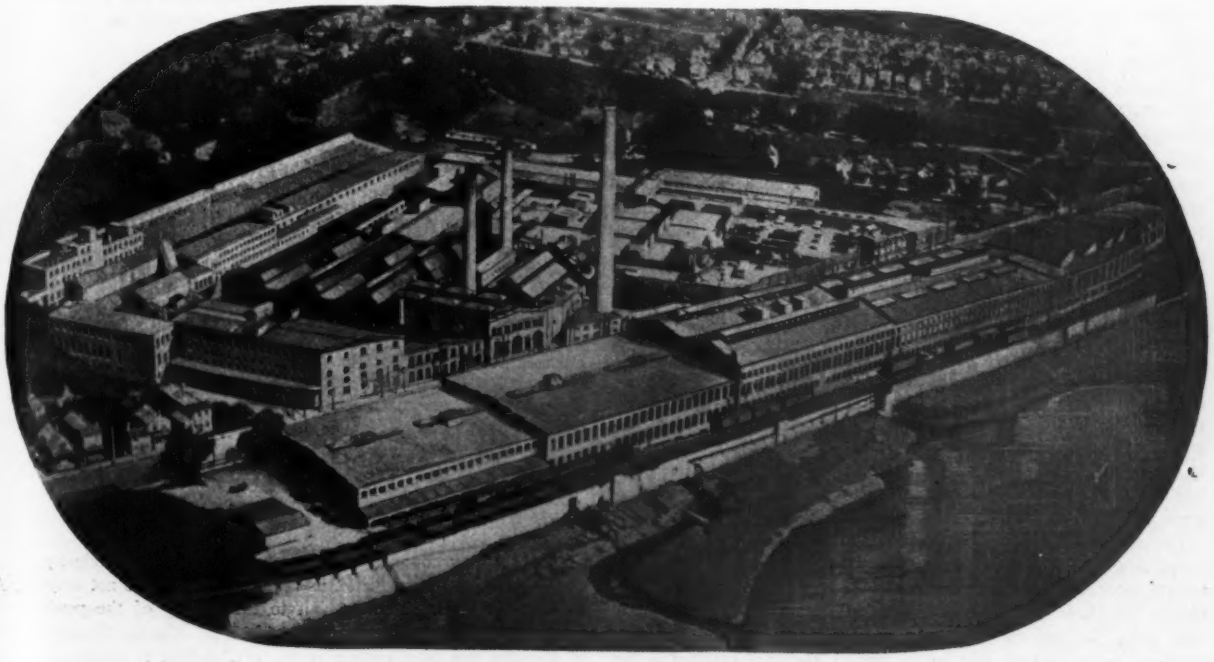
March, April and May business continued to be very fair. By the month of June, orders began to drop off and the market was very weak. Production slowed down to about 75 per cent of capacity for the remaining months of 1923. This was about the condition with nearly all of the book mills which meant lowering prices and considerable price cutting, although during this period, contract prices remained firm until March 1, when there was a general reduction of about $5.00 a ton made on all grades.

As there was no lowering in the costs, this reduction brought the prices down to very little, if any, margin to the manufacturers.

Business for January, 1924, showed some improvement and February a further improvement. While all the mills were not able to run 100 per cent, they were able to make some reduction in their inventory, prices remaining fairly firm with less price cutting.

In the month of March, the consumption seemed to have about reached the total quantity of paper produced and from the present indications, it would seem that the demand for the next few months will enable the manufacturers to operate full time.

The publication trade seems to be remarkably good, circulation increasing and publications taking on a very much larger percentage of advertising than they did last year, which would indicate that the demand for paper made by the book mills will be fairly good over the balance of the year.



MILLS OF THE CHAMPION COATED PAPER CO., HAMILTON, OHIO, TAKEN FROM AN AEROPLANE.

Past Year Was Perplexing One for Pulp Trade

First Three Months Were Marked By Confusing Conditions Which Made Correct Decisions in Buying for Forward Deliveries Difficult—Decreasing Business During Second Quarter Was Followed By a Spotty Demand in July, August and September and the Third Quarter Proved Unquestionably a "Buyers' Market"—A Year Characterized As One of Deception Ended With Confidence in the Future.

Written Especially for the Annual Number of the Paper Trade Journal By O. F. Swanson, Sales Manager of J. Anderson & Co. and The Pulp and Paper Trading Co.

In reviewing the events of the pulp trade of 1923, the outstanding feature, during the first quarter of the year, was the developing of confusing conditions making correct decisions regarding purchases of pulp for forward deliveries, very interesting and somewhat difficult.

Unusually heavy importations during the last quarter of 1922, of all kinds of chemical pulp, especially of kraft pulp and strong unbleached sulphite from Sweden, together with frequent resales, at below market prices, had a tendency to disturb the confidence of the trade.

On the other hand, indications of sound trade conditions in general, optimistic expressions of views by keen judges in the trade, scarcity of groundwood, chiefly caused by low water in the several countries producing this pulp, labor difficulties in Sweden, where the wage agreement between employers and employees terminated February 1, and last but not least, the characteristic American trait of looking at everything from the rosy side, all had a counteracting and encouraging effect, so that the majority of both buyers and sellers calculated the then prevailing or higher prices would govern sales for several months ahead. This resulted in a fair tonnage of chemical pulp placed both for prompt and forward deliveries.

Cause of Business Recession

With such a large producer of chemical pulp as Sweden practically out of the market as far as shipments were concerned, and practically all of its most important exporting pulp mills down on account of the lockout, which went into effect on January 29, thereby reducing the usual available tonnage for forward shipments considerably, which in itself was a sufficient factor to create a firmer sellers' market for mechanical pulp, the assumption that prices would either remain at prevailing level or go somewhat higher was apparently justified, but as there was no particular improvement in the American paper business when the Swedish strike commenced, the slight advance in prices caused, if anything, a recession in business.

However, with the possible exception of groundwood, the supply of all kinds of pulp was sufficient to cover both immediate requirements and for several months ahead, and as the Swedish strike was rumored to terminate sometime in April, a few buyers, as well as some sellers, were of the opinion that there would be a reduction of prices either immediately upon the starting of the Swedish pulp mills or shortly thereafter and, as a consequence, endeavored to cover their immediate requirements. It was reported that they had succeeded, to a great extent, in doing so, with such grades as were available for resale.

The groundwood situation was distinctly different—it usually is—and this time it was brought about by low water conditions for several months past. Some groundwood mills had been down completely, but those left, some of which had been running part of the time only, for months, did so wonderfully well, especially with reference to production, that by the end of March it resulted in the weakening of prices of this commodity. Of course, in a measure, this was also due to the frequent intervals of mild weather causing improvements in water conditions—in the rivers—resulting in a number of previously idle grinders being reverted into pulp producers again.

How Groundwood Prices Are Fixed

Having heard a great deal about water, oil and a few other similar raw materials lately, in some cases of which the accent is decidedly on the first word (raw), and lest we forget the subject, it is a case of about fifty-fifty between water and wood—I mean pulpwood, when it concerns mechanical wood pulp, "groundwood," and plenty of this blessed—or otherwise, depending on one's taste—Volstead Fluid, is absolutely necessary in making groundwood economically. Unusual dryness: shrinking pulp pile with out of proportion swiftly rising prices. Moderate dryness: bigger pulp pile and plenty for all at moderate prices. Its almost human sensitiveness is remarkable and, being susceptible to and dependent on any and all changes ordered by Mr. Weatherman, the prices of groundwood are indirectly and invariably also fixed by him and quoted subject to change without notice, with a few other subjects thrown in.

Sales prices based on tons of 2,000 lbs., air dry fiber, f.o.b. shipping points American and Canadian Pulp Mills and Exdock Usual Atlantic Ports on Imported Pulp were reported as follows, the variation in same depending on quality.

IMPORTED PULP

	January	February	March
Prime bleached sulphite...	$85.00 to 100.00	$90.00 to 100.00	$90.00 to 100.00
Prime easy bleaching sulphite	62.00 to 65.00	64.00 to 70.00	70.00 to 75.00
Prime mitscherlich unbleached sulphite.....	58.00 to 62.50	65.00 to 70.00	68.00 to 70.00
Prime strong unbleached sulphite	58.00 to 60.00	65.00 to 67.00	68.00 to 70.00
Prime kraft pulp.....	58.00 to 65.00	62.50 to 66.00	64.00 to 66.00
Prime groundwood	40.00 to 45.00	37.50 to 42.50	35.00 to 40.00

DOMESTIC PULP

Prime bleached sulphite....	$85.00 to 100.00	$85.00 to 100.00	$85.00 to 100.00
Prime easy bleaching sulphite	62.50 to 72.50	65.00 to 72.50	65.00 to 75.00
Prime strong unbleached sulphite	60.00 to 65.00	62.50 to 65.00	62.50 to 65.00
Prime kraft pulp.....	60.00 to 65.00	62.50 to 67.50	62.50 to 65.00
Prime unbleached mitscherlich sulphite	65.00 to 75.00	67.50 to 75.00	67.50 to 75.00
Prime groundwood.....	42.50 to 45.00	37.50 to 42.50	35.00 to 40.00

From the above prices the first quarter of 1923 confined December's evidence of good business in all grades of pulp.

Continuous Process Necessary

In order to accomplish the best results in the pulp industry, continuous process of production is required. This does not only apply to the cost of manufacture, but to the quality of the product as well, although in a somewhat lesser degree. Making Chemical pulp of uniform and high quality is an "art," which is seldom attained by mills hampered by frequent shut-downs, or other conditions tend-

ing to disturb a smooth run. Consequently, when the Swedish strike terminated in April there was some question in the trade as to the quality buyers of Swedish pulp would receive from the mills upon resumption of operations and until everything was running smoothly again.

The activity of the pulp market in April compared with March was less vigorous and with the termination of the Swedish strike, the policy of "watchful waiting" spread until it became almost general, resulting in a rather sluggish market in May and light demand for pulp in June. But the slowing up of the board and paper market during these two months was undoubtedly the chief factor for the less active demand for pulp. However, in spite of this, prices were quite firm and quotations from various countries, especially from Canada and Scandinavia, showed evidence of strength.

Anticipated labor trouble—and this time in Norwegian pulp mills—had a strengthening effect on the Scandinavian pulp situation, and was one of the main factors for the firm quotations on pulp from both Norway and Sweden. A large tonnage of bleached sulphite of exceptionally high quality, together with other grades of chemical pulp, as well as groundwood, are imported from Norway. Hence, the effect referred to.

Prices quoted:—

IMPORTED PULP

	April	May	June
Prime bleached sulphite	$80.00 to 100.00	$80.00 to 100.00	$80.00 to 100.00
Prime easy bleaching sulphite	70.00 to 75.00	70.00 to 75.00	70.00 to 75.00
Prime Mitscherlich unbleached sulphite	68.00 to 72.00	68.00 to 70.00	68.00 to 70.00
Prime strong unbleached sulphite	62.50 to 68.00	64.00 to 70.00	64.00 to 70.00
Prime kraft pulp	62.50 to 70.00	62.50 to 68.00	62.50 to 68.00
Prime groundwood	40.00 to 42.50	40.00 to 45.00	40.00 to 45.00

DOMESTIC PULP

	April	May	June
Prime bleached sulphite	$85.00 to 100.00	$80.00 to 100.00	$75.00 to 100.00
Prime easy bleaching sulphite	65.00 to 75.00	70.00 to 75.00	68.00 to 72.50
Prime strong unbleached sulphite	62.50 to 65.00	60.00 to 65.00	60.00 to 65.00
Prime kraft pulp	62.50 to 68.00	60.00 to 68.00	60.00 to 68.00
Prime unbleached Mitscherlich sulphite	67.50 to 75.00	65.00 to 75.00	65.00 to 75.00
Prime groundwood	37.50 to 40.50	40.00 to 45.00	40.00 to 45.00

Second Quarter Only Fair

As a result of the decrease in business the second quarter of the year, the pulp business for the entire six months was only "Fair."

The demand for pulp in July, August and September was rather spotty, with consumers preferring to buy from "hand to mouth." The usual seasonable dullness set in about July 1 and prevailed throughout the month, including August and September. The Norwegian strike was of short duration, lasting about three weeks and terminating about the middle of July. No further labor troubles being in sight, whether in Sweden, Norway or in other pulp producing countries, the maximum production of pulp was expected for the rest of the year.

Prices on chemical pulp eased off somewhat, but ground wood, running true to form of being different, tightened up. Resales of almost every type of chemical pulp at prices considerably lower than those acceptable by the pulp mills were frequently reported. Such resales were either for the account of the consumers, who had taken advantage of the low prices in 1922 and more than covered their requirements, or on the part of dealers, in a position to offer pulp for prompt shipment, who decided to realize on their commitments before the next break in prices.

Owing to the dry weather prevailing in the United States, Canada and other countries where ground wood is made, prices on this pulp continued firm, and with the increased demand, the outlook for lower prices was very remote unless the water conditions improved.

The market for bleached sulphite was very quiet, partially due to the business in fine paper being more depressed than in lower grades, resulting in very little business being done in bleached sulphite but prevailing prices were maintained more or less, mostly less, on several mediocre grades, both Imported and Domestic, which, however, seemed to be sufficiently good to answer the purpose in several cases where leading brands, made in the United States, had previously been used.

Reduction Fails to Stimulate

When therefore quite unexpectedly one of the large American manufacturers announced a reduction of $10.00 per ton in bleached sulphite, it was quite generally understood that the sales of the lower grades referred to were responsible for this reduction. Similar announcements of bleached sulphite by other manufacturers followed in rapid succession, and if the reduction was intended to stimulate consumption, it failed to attain its object.

IMPORTED PULP

	July	August	September
Prime bleached sulphite	$75.00 to 100.00	$75.00 to 100.00	$70.00 to 90.00
Prime easy bleaching sulphite	65.00 to 72.50	65.00 to 72.50	65.00 to 72.50
Prime unbleached Mitscherlich sulphite	65.00 to 70.00	65.00 to 70.00	66.00 to 70.00
Prime strong unbleached sulphite	65.00 to 70.00	65.00 to 68.00	62.00 to 68.00
Prime kraft pulp	62.50 to 68.00	62.50 to 68.00	60.00 to 65.00
Prime groundwood	40.00 to 45.00	40.00 to 45.00	45.00 to 50.00

DOMESTIC PULP

Prime bleached sulphite	$75.00 to 100.00	$75.00 to 100.00	$70.00 to 90.00
Prime easy bleaching sulphite	65.00 to 70.00	65.00 to 70.00	62.50 to 70.00
Prime strong unbleached sulphite	58.00 to 65.00	58.00 to 65.00	55.00 to 65.00
Prime kraft pulp	60.00 to 65.00	60.00 to 65.00	60.00 to 67.50
Prime unbleached Mitscherlich sulphite	65.00 to 72.50	65.00 to 72.50	65.00 to 72.50
Prime groundwood	40.00 to 45.00	40.00 to 45.00	45.00 to 50.00

With a few exceptions—and the pulp business was one—business conditions in general were sound, but prospects for more normal activities in the pulp trade during the last quarter of the year were not yet in sight. The above prices are high compared with prices on re-sales. The third quarter of the year was, without question, a "buyers' market."

There were no outstanding features of the pulp market during October, although more inquiries for Chemical pulp were received both by mills agents and dealers. The actual demand, however, was still below normal for this time of the year and the pulp mills, both on this side and abroad, were still without the large orders for forward deliveries usually placed at this time. The number of small orders were increasing and this in itself was taken as an indication for a slight improvement and a little more optimism was prevalent. Meanwhile the regular market quotations were about the same as of September, except on bleached sulphite which was offered at reductions from $5 to $10 per ton.

Water Conditions Trouble

Owing to the acute water condition in localities of the mills, groundwood was again a fairly scarce article, and the prices from $3 to $7 per ton higher. Almost weekly price fluctuations prevailed depending on the color, size and activity of the clouds hovering about in the neighborhood of or directly above, either humming or silent grinders. Sometimes an order for this commodity was telegraphed one day urging rush shipment, and by the same method of communication cancelled the next day. As a consequence, in some quarters, orders for groundwood were considered about as uncertain as the weather. However, in the meantime, those mills fortunate enough to supply the trade with at least a fair percentage of their capacity production reaped the harvest and enjoyed another spell of temporary prosperity, which by the way, according to the laws of equalization, if such exist, they were justly entitled to, because anyone with courage enough to own and run a groundwood mill with a view of supplying the paper and board manufacturers with this very important and necessary commodity, and by so doing benefitting the whole civilized world, certainly should make hay—I mean pulp—while the sun shines, and at the same time gather in all the dollars he possibly can for a rainy day.

However, the flurry was brief and the prices in November and December were reduced to about the level of September prices. Sales of chemical pulp increased considerably during November and December, presumably on account of the comparatively attractive prices at which orders were "solicited" for leading brands of imported bleached and unbleached sulphite and kraft pulp. This method of securing business instead of improving conditions usually has a reverse effect not only on the pulp business, but on the paper and board business as well. No matter how high prices on pulp may be as long as they are universal, they will never upset the market of the buyer's own product nor even cause a significant disturbance in his own trade, but whenever business in pulp is solicited confidentially at the buyer's best prices, it calls for extreme caution on the part of the buyer, because pulp business secured in this way is usually a forerunner of ridiculously low prices in the near future, and when this happens, it reflects in a greater degree on the prices of the consumer's own product, and as a consequence, making him a greater loser than the agent who negotiates business by this method.

Sharp Reduction Comes

Resorting to the above method in an effort to secure large orders was, to a great extent, responsible for the sharp reduction in prices during November and December on all grades of sulphite, sulphate and kraft pulp, and judging from reports indicating a substantial increase in tonnage placed, compared with the two preceding months, it is quite effective as an "order-getter," but once in momentum, difficult to check until it has attained its object of "moving" a large tonnage and causing the issuing of new editions of price lists of various finished products in which pulp constitutes the main ingredient. Regular market prices were quite generally disregarded whenever there was a fair sized order in sight, and prospective business usually went to the lowest bidder.

The rather strong feeling of confidence prevailing among pulp, paper and board manufacturers at the beginning of 1923, and in spite of the fact that the year of 1923 may rather be characterized as a year of deception, a feeling of confidence in the future was quite generally prevalent at the end of the year.

Although the prospects for prosperity of the pulp industry for the immediate future are far from bright, there are great possibilities for the modern and efficiently managed mills both on this side and abroad, but until the "slack" between the pulp mills and the paper mills is taken up either by a greater consumption of pulp or a decrease in tonnage made, will the overproduction of all kinds of chemical pulp re-act on prices, causing frequent fluctuations. That there is an over-production is evident by the fact that the great Swedish lockout and strike, causing a reported reduction in tonnage of about 160,000 tons of sulphite, 50,000 tons of sulphate and kraft pulp and 75,000 tons of moist mechanical woodpulp, did not even stimulate the demand. Low prices will only give temporary relief, because the American paper and board manufacturers also engaged in the manufacture of sulphite and kraft pulp for their own use, usually reduce their own pulp production only for the time that they are able to cover either partially or entirely their requirements in the open market at prices sufficiently below the actual cost of their own pulp to warrant the curtailment of production of same.

Danger of Low Prices

Actual selling prices at the end of 1923 on most grades of chemical pulp, whether American, Canadian or European, being on an average of about $12 per ton below the first quarter's average prices, there is not only a danger of the prices reaching such a low level during the first nine months of 1924, that profits in most pulp mills will be eliminated entirely, but also that they will not cover the actual cost of the pulp.

Owing to the demand created by excellent quality of pulp for certain purposes, where the *quality* and not the *price* is the most important feature, some grades of American, Canadian and Scandinavian bleached sulphite, as well as Canadian kraft pulp, are less susceptible to the effect of low prices, because such grades of bleached sulphite are usually bringing from $15 to $20 per ton more than other grades, and the exceptionallly high quality of the Canadian kraft pulp referred to from $10 to $20 per ton more than obtained for leading brands of imported kraft pulp. However, such leading brands of Swedish and Norwegian kraft pulp, sulphite and groundwood, as well as Finnish sulphite, and a few brands from other European countries, indicate continued improvement in quality and with the rapidly decreasing supply of pulpwood in the United States will, together with Canadian Pulp, undoubtedly retain their important position in the American market for several years to come—thereby, in a great measure, assisting American Paper and Board manufacturers to effectively control the home market of their own product and also enabling them eventually to compete in the market of the world as well.

Judging from present indications, the outlook for business in both pulp, paper and board for the year of 1924 is more satisfactory in a general way than conditions prevailing throughout 1923, but comparatively low prices together with keen competition, with some improvement in this respect toward the end of the year, is expected. However, as keen competition usually leads to improvement of the mills, with a view of reducing the cost of manufacture to the minimum, and besides making manufacturing imensely interesting, it also has a beneficial effect in the trade as well as in the mills, of which the operation becomes more efficient with keen competition.

With prices on practically all kinds of raw materials closer to cost and less possibilities for great fluctuations, another step toward a more stable market is taken, thus creating more healthy conditions in the trade, as well as better possibilities for well managed pulp mills whether on this side or abroad; and this is predicted for the year of 1924, in spite of it being a Presidential Year. Consequently, all there is to it is: Let's go! also to the polls in due course—and may the best man win.

FEBRUARY PULP AND PAPER PRODUCTION

Production of paper by identical mills reporting to the American Paper and Pulp Association and co-operating organizations showed a decrease of 3 per cent in February from the January production, according to the monthly statistical summary of the paper and pulp industry.

The tonnage summary is prepared by the American Paper and Pulp Association with the co-operation of the Binders' Board Manufacturers' Association, News Print Service Bureau, Tissue Paper Manufacturers' Association, Wrapping Paper Manufacturers' Service Bureau and Writing Paper Manufacturers' Association. The figures for February are as follows:

Grade	Number of mills	Production Net tons	Shipments Net tons	Stocks on hand end of month Net tons
News print	68	117,322	115,427	30,288
Book	51	68,298	72,183	33,592
Paperboard	108	110,110	109,556	35,072
Wrapping	89	50,537	51,762	57,761
Bag	26	9,346	9,617	5,829
Fine	83	25,595	25,674	38,644
Tissue	45	10,097	10,255	7,082
Hanging	9	4,451	3,961	2,444
Felts	18	9,763	9,880	1,154
Other grades	62	17,970	20,266	14,134
Total—All grades	..	423,489	428,581	226,000

The statistical table below gives the number of mills reporting to the American Paper and Pulp Association and the U. S. Pulp Producers' Association, and the data as to production of the various grades of pulp in February.

Grade	Number of mills	Production Net tons	Shipments Net tons	Stocks on hand end of month Net tons
Ground wood pulp	102	93,415	4,869	88,017
Sulphite, news grade	38	40,901	3,276	18,107
Sulphite, bleached	19	18,866	2,320	3,581
Sulphite, easy bleaching	6	5,866	732	1,511
Sulphite, Mitscherlich	6	5,287	301	1,115
Sulphate pulp	12	12,978	2,427	6,642
Soda pulp	11	13,928	4,156	2,595
Other than wood pulp	2	127	80	23
Total all grades	...	191,368	18,161	122,191

The Year in Rags and Waste Paper

Business Good On the Whole, But in Some Respects Unhealthy—Roofing Rags Which in December 1923 Sold As Low As $1.10 in February Only Two Months Later Reached $3.00, An Increase of One Hundred and Seventy-Four Per Cent—Most Mills Consuming Waste Paper Ran Only Sixty Per Cent of Capacity and This Has Been Reflected in the Price of Waste Paper Since Early Fall.

Written Especially for the Annual Number of the Paper Trade Journal By Walter R. Hicks of Daniel M. Hicks, Inc., New York.

Hark! Hark!
The dogs do bark,
The Paper Makers have come to town,
Some for Rags
Some for Jags,
Even as you and I.

This charming bit of verse was not selected because of any particular merit it might possess, but is used merely as an ice-pick to break through the surface of the cold data contained in a review. Neither is this sparkling gem of rhyme the text of this article. It is used to introduce the occasion that brings into being, the Annual Convention and with it the market report.

Age of Shifting Policies

The Waldorf Astoria is the chosen place and the paper makers the chosen people. They will prove that paper is made in the Jordan and not in the beaters; discuss how to make board with the least quantity of tin cans and how to make paper with the most interest bearing coupons possible. They will outline policies for the future, based on the element which plays such a large part in business, namely, the forecasts of economic experts with its cycles, circles and curved lines. It is the age of shifting policies and ultramodernism and although principles often clash, popular clamor makes demands, many of which are adopted not because they are sound, but often because they are fashionable. With the advent of the cigarette into the boudoir, delicatessen meals pervading the sanctity of the home; with the short skirts and strained eyes, the women trying to remove as much hair from their heads as they can and the men at their wits' end trying to keep it on their own heads, it is not surprising that we have the fortune teller playing a prominent part in business. These striking examples will serve to show the frame of mind of the country. As somebody put it, speaking of life, "It used to be wine, women and song"; today, it is "near-beer, your own wife and congregational singing."

A New Situation Developed

Supply and demand is the fundamental law of economics and no economist's service can regulate or control business; nor can they prognosticate the incidents that will be the governing force, determining the rise and fall of any market. There has developed a situation that has played a large part in the planning of policies in connection with the program of all industries in general. This procedure has brought about a one sided state of affairs, inasmuch as it has resulted in the buyers on the whole being in the market at one time and dropping out at one time, all of which has a disastrous effect on the market. When there is no buying we see prices fall to levels that make it unprofitable to pack the stock and production falls off but when the demand springs up and the buying campaign is in force, with a limited supply to draw from, we find ourselves in the midst of a boom. The roofing market is a good illustration of this condition. In December, 1923, roofing rags were as low as $1.10 per hundred pounds and in February, 1924, only two months later, the price reached $3.00 per one hundred pounds, an increase of one hundred and seventy-four per cent. All the felt mills were caught, some confronted with a shut-down due to no stocks. This drove fiber rags up proportionately, for it became necessary for the fiber mills to pay the price or the grades they use would all go for roofing. The same situation happened on waste paper. In the early year, mixed started to drop to almost pre-war levels and then under a sudden demand, jumped to one and a half cents in a short time. The prices of the higher grades of waste paper remained fairly firm throughout the year, with a slightly downward tendency toward the end. About $3.60 was the highest price on soft white shavings and about $4.30 was the top for hard white which today is mostly the sulphite envelope cuttings. Books reached a high level of $2.25 in July and a low of $1.50. Waste paper did not do so well on the whole as it did in the previous year, as the big business of the year was in rags.

Prices of All Grades of Rags Advance

Staple cotton was high and this resulted in hundreds of tons of new and old cotton rags going into consumption for shoddy and shredding, all of which drew from the supply of paper making material and this extra demand advanced the prices of all grades of rags. Linters and cotton waste were too high to be used as a substitute so there was no relief from that source. This situation was more pronounced abroad. Europe as we know, is not a cotton producing continent and not only cotton rags were broken up to relieve the shortage, but also linen and jute stock. This condition abroad took out of the market large tonnages that would otherwise have been exported to this country. With the exception of the writing mills, practically all the other rag consuming mills were running a hundred per cent. The demand exceeded the supply and from early fall we had advancing prices in all grades until February of this year, when there was a runaway market. The greatest excitement prevailed in the lower grades particularly. The better grades advanced more steadily and while the demand was not so keen in these grades, the shortage was greater.

Waste Paper

Most of the mills consuming waste paper were only running 60 per cent of capacity and this reflected on the prices of waste paper since the early fall. In spite of this the prices of most grades remained fairly firm, although they were not very high at any time. If the mills were running one hundred per cent, we would have seen waste paper as high as at any time since the boom market of 1920. In spite of the low consumption, there has been no surplus at any time and any increased demand would result in sharp advances.

Rope, Bagging and Strings

Rope, bagging and strings came in for their share of spotlight values. Rope went from four and three-quarters to seven and one quarter; strings more than doubled in valued, going from about eighty cents to two dollars per pound. The paper bag business was

particularly good and further strengthened by the high price of cotton bags. This kept the wrapping mills in the market and the prices continue firm around their present levels.

Business, On the Whole, Good

On the whole, business was good over the year, although in many cases I consider it unhealthy. Steady demand marks healthy business; sudden rises and falls in price denotes weakness. There is alway reaction after every advance or decline and this throws the market into an unsettled condition. The time to buy is when a thing is cheap and where this is done, a mill can be out when prices are high. The new normal of values is higher than the prewar level and while this has not had a chance to really establish just what that new normal is, it must without a doubt be over the old normal. It is safe to assume that a grade is low in price when it approaches a level approximately fifty per cent more than the prewar price. If the mills would adopt a policy of buying that which is cheap, on some such scale, and holding in reserve a good supply, they could buy on the market when business is good and when prices reach prohibitive levels, drop out of the picture and use up their reserve supply. If enough mills would follow this procedure, it would stabilize the market, keep things within sane limits and make business more wholesome and profitable to all concerned.

High prices bring out stocks and low prices curtail production. The buyers try to force down prices by other methods and when there is a drop they keep out, thinking it will go just another dollar a ton lower. When there is a turn, there is always the scramble to cover and away she goes. It is like the Irish fireman on a railroad who thought he would put the great express engine up for the night. He grabbed the lever and she shot forward into the engine house. Then he grabbed the reverse by mistake and she shot backwards down the track. Again he seized the forward lever and she sprang again into the engine house. Again he madly grabbed at the reverse and she whizzed backwards out through the open door and down the track. This kept up several times and at last the engineer scrambled aboard and stopped the giant locomotive. He turned to the Irishman and said, "What are you trying to do, don't you know you can lose your job for a trick like that?" "Me," said the Irishman, "Me, when I had her in there why the devil didn't you shut the door." And so, those mills that know the force they control will at all times grab the right lever and not have to look for someone else to "shut the door."

Have Courage of Convictions

Have the courage of your convictions and don't play a system. The "dope sheet" is condemned in horse racing and the stock market. Your business is built up on your own judgment and success will be consequently measured by your own convictions.

HOWARD SMITH MILLS IMPROVE CORNWALL PLANT

Extensive improvements have for some time been in progress at the Cornwall Division of the Howard Smith Paper Mills, Ltd. This plant was formerly the plant of the Toronto Paper Manufacturing Company and the improvements which are now being completed will adapt it to the purposes of the Howard Smith mills.

A New Finishing Room Built

A new finishing room has been built. This is three stories high and 133 by 186 feet. A new machine shop has also been built where first class equipment is installed for doing general repairs.

Many who have seen the latter agree that it is one of the best machine shops attached to a paper and pulp plant anywhere. The machine room has been extended over Nos. 3 and 4 machines.

To the No. 4 machine is now being added a new cylinder mould which will give this machine five cylinder moulds and 18 four foot dryers, three new presses and one new stack of calenders. The addition of the latter will equip the machine with three stacks of calenders.

It is on this machine that the company runs its bristol and filled board.

Conveying System Increased

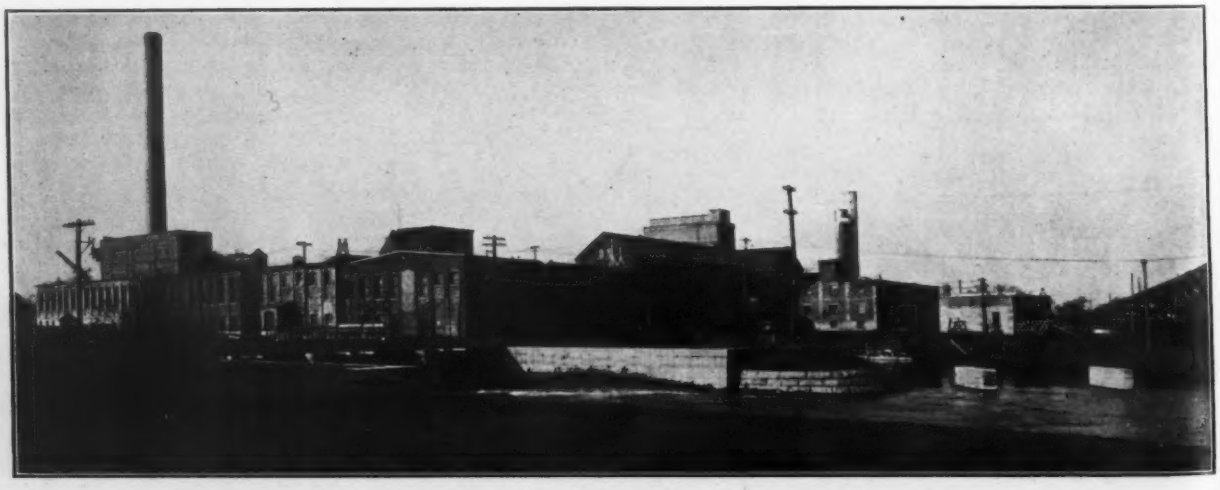
The scope of the conveying system has been increased by the recent building of a wharf at which will be handled direct from the boats the wood which comes from the company's limits in Gaspe.

The production of the Cornwall plant will be approximately 50 tons of paper per day and 60 tons of sulphite pulp. A Kaymr press has been installed in the sulphite mill which will take the output of sulphite pulp.

Additions to Beater Equipment

Another addition has been two 1,200 pound beaters to the beater equipment. These are of the regular Holland type.

In the new finishing room is located, at one end, the shipping room which will handle three freight cars at a time, shunted directly into the building. This will enable the company to get away from trouble during the severe weather.



CORNWALL DIVISION OF HOWARD SMITH PAPER MILLS, LTD., SHOWING IMPROVEMENTS.

Paper Makers' Chemicals Have Good Year

On the Whole a Satisfactory Volume of Business Was Done During the Year in All the Leading Items—Over Production Caused Some Price Reductions During July and August But By the Beginning of 1924 Surplus Stocks Had Been Disposed of and the Market Assumed Healthier Tone—Prices at Present Favorable to Buyers and Likely to Be Higher—Feeling of Confidence Increasing.

Written Especially for the Annual Number of the Paper Trade Journal by Guy A. Gardner, Mgr., Chemical Div., M. Gottesman & Co., Inc.

A review of market conditions affecting paper makers' chemicals during the past year tend to show, as a whole, that a satisfactory volume of business was done in all the leading items. During the last few months of 1922 and the early part of 1923, the demand was unusually heavy from the chemical consuming industries of which the paper and pulp manufacturers are among the most important. As a result the chemical manufacturers were in many cases compelled to increase production considerably to keep pace with the demand, and this increased production resulted in an accumulation of surplus stocks in some lines when the usual summer curtailment in consumption came along. In order to move this tonnage reduced price schedules went into effect during July and August of 1923, and on one important paper making chemical in particular, prices were sharply reduced.

By the beginning of this year, however, most of the surplus stocks had been disposed of and, as a consequence, the chemical market resumed a more healthy tone, prices becoming firmer and in many cases, considerable price advances have been recorded. This, of course, was inevitable as the cost of production had not decreased, and most of the low values prevailing during the latter part of 1923 were caused by manufacturers being compelled to dispose of excess production, and the prices quoted were in almost every case below present day manufacturing costs.

Some Price Comparisons

The following price comparison table showing the prices on the more important paper makers' chemicals illustrates the price fluctuations during the past year:

Prices F. O. B. Works in Carload Quantities

	April 1, 1923	Dec. 1, 1923	March 15, 1924
Aluminum Sulphate, Commercial, in bags	$1.25/1.40 per 100 lbs.	$1.15/1.25 per 100 lbs.	$1.15/1.25 per 100 lbs.
Aluminum Sulphate, Iron-free, in bags	2.15/2.25 " " "	2.00/2.25 " " "	2.00/2.25 " " "
Bleaching Powder, 35/37%, in drums	1.90/2.00 " " "	1.25 " " "	1.90 " " "
Casein, in bags, duty paid	22/25c per lb.	14/17c per lb.	11/12c per lb.
Soda Ash, Light, 58%, in bags	$1.50 per 100 lbs.	$1.38 per 100 lbs.	$1.38 per 100 lbs.
Caustic Soda, 76% Solid, in drums	3.25 " " "	3.10 " " "	3.10 " " "

The significance of these price changes can more readily be appreciated by taking into consideration the various factors, both in the paper industry and other chemical consuming trade, which affected the markets of the respective commodities.

Bleaching Powder

The wide fluctuations in the price of bleaching powder, one of the most important paper making chemicals, during 1923, was an instance of the prevailing condition in the heavy chemical market Due to over-production and a lessened demand, quotations on this material declined to the 1914 price level and in some cases even below that figure, especially during the summer months. By the first of this year, however, the demand had increased somewhat and surplus stocks having been in great part disposed of, the price was advanced to a point more in line with manufacturing costs.

Sulphate of Alumina

Due to keen competition during the past year and a somewhat lessened demand, the price of paper makers' alum has declined considerably from the price prevailing in 1922 and the early part of 1923. It is now possible for paper manufacturers to purchase this important paper makers' chemical at a price very little above the pre-war figure. The cost of manufacturing alum is still high and there seems every reason to believe that the price will be increased in the near future as the conditions affecting this item are practically similar to those which caused the fluctuations in the price of bleaching powder.

Caustic Soda and Soda Ash

The outstanding features of the caustic soda and soda ash market during the year were the reduction in the prices which went into effect the latter part of 1923 and the change from the old system of quoting on the basis of 48 per cent for soda ash and 60 per cent for caustic soda to a flat basis for the actual alkali content. This change in the method of quoting was generally considered a decided improvement as it simplified matters for the buyer and will no doubt be greatly appreciated by the consumers of both soda ash and caustic soda.

Salt Cake

The market price on salt cake has been fairly well maintained during the past year despite the fact that the demand from the pulp manufacturers has been slow, particularly in the last four or five months. The window glass and plate glass manufacturers, however, have been enjoying exceptionally good demand for their product owing to the large building operations and to the increased production of automobiles, particularly of the closed-car type, which has greatly increased the use of plate glass. The production of salt cake has also been materially lessened owing to the fact that the demand for the acid of which it is a by-product has not been heavy during the past months and curtailment of production has resulted as a consequence. All these factors tend to keep the market price of salt cake fairly firm, and as there are little, if any, surplus stocks on hand, a very slight improvement in the demand would tend to an increase in price.

Casein

During the past year, the casein market was notable for very wide and rapid fluctuations in price. During the spring and early summer months, the price of casein rapidly advanced due to scarcity of supplies, and these high prices were fairly well maintained during the summer months. Since then, however, there has been a gradual decline in price and the quotations now being made are

very close to normal. There has been considerable agitation during the past year with reference to the duty of 2½ cents which the new tariff imposes on casein. Many of the importers and consumers have felt that this duty is excessive and have been trying to get it reduced but so far without much success.

Prices Likely to Advance

The price level of practically all the basic chemicals today should prove decidedly attractive to buyers and warrant them purchasing their future requirements with complete confidence in the stability of the market. It is freely predicted that chemical prices will advance generally during the next few months, and there is every good reason to believe that these predictions are well founded in fact, as most of the developments during the past month or two have been such as to increase the feeling of confidence in the outlook for the coming months.

SARANAC PULP & PAPER CO. TO START MILL IN JUNE

Written Especially for the Annual Number of the Paper Trade Journal

Back in 1904, the Allens of Hudson Falls, N. Y., and the Guibords of Plattsburgh, N. Y., organized a company called the Saranac Company for the purpose of taking over the property known as Treadwells Mills, located on the Saranac River about four miles west of the city of Plattsburgh, N. Y. The company was successful from the beginning and its product, widely known as Saranac ground wood pulp, was recognized in the trade as a superior article and found a ready market among the paper mills of northeastern New York. Realizing, however, that the shipment of ground wood with a large content of water was an economic absurdity, the company was always on the alert for an opportunity to utilize its ground wood in the manufacture of paper.

The opportunity for expansion came during the early part of 1923 when a new company was organized called the Saranac Pulp and Paper Company for the purpose of absorbing the Saranac Company and for expansion into a complete pulp and paper mill unit. The Lozier factory plant in the city of Plattsburgh consisting of 25 acres of land on the shore of Lake Champlain together with buildings, machinery, docks and shore frontage and side tracks, was quietly purchased by interests affiliated with the Saranac Company and taken over by the new company with the idea of converting the Saranac mill into a hydro-electric power plant and connecting the two properties with a five mile transmission line so that a complete pulp and paper unit would result on the shore of the lake.

This location long appealed to the owners because of the nearness to a labor market in the city of Plattsburgh, where labor is abundant and strikes unknown; where an abundance of pure water is always available, where cheap transportation on raw materials such as wood, coal and sulphite would bring these materials to the door of the mill; where railroad sidings were already built and where modern brick and steel buildings with slight changes stood ready to receive pulp and paper mill machinery in such a manner as to make manufacturing a continuous and progressive process and all on the ground floor.

At this time H. P. G. Norstrand, manager of the Stevens & Thompson mills at Greenwich, N. Y., was invited to come into the organization. He visited the plant, examined and approved the plans and was so impressed with the advantages of the project that he resigned his position and on June 1, 1923, came to Plattsburgh to take active command of the new enterprise as president and general manager.

The company is installing the machinery in its hydro-electric plant where there are two units, one of 1,500 horsepower, the other of 2,100 horsepower. The water wheels are of the vertical type made by the S. Morgan Smith Company of York, Pa., and the generators direct connected are the latest product of the General Electric Company.

Current will be generated at 2,300 volts, stepped up to 13,200 volts for transmission. At the mill in Plattsburgh current is stepped down to 2,300 and 600 volts for use in pulp and paper mills.

Two paper machines, one a 93 inch cylinder machine built by the Sandy Hill Iron and Brass Works, the other a 132 inch Yankee machine built by the Beloit Iron Works of Beloit, Wis., are now being installed together with four 1,000 lb. beaters and two Monarch Jordans built by the Noble & Wood Machine Company, Hudson Falls, N. Y., and all other necessary equipment.

The cylinder machine will be equipped with a full sectional drive made by the General Electric Company and will be, as far as known, the first cylinder machine in the United States so equipped. The entire mill is electrically operated, each unit being equipped wherever possible with individual motors. No steam engines will be used and the boiler plant will only be called upon to furnish steam for drying purposes and heating. Steam at 150 lbs. pressure passes through a General Electric steam turbine direct connected to a generator which delivers current to the buss bars from the hydro-electric station.

The pulp mill has been re-established on the lake shore. It has four 27 x 54 inch grinders driven by four 500 horsepower synchronous motors, six wet machines and all necessary equipment.

In general the plant will have the very best and latest type of machinery, all electrically driven under the best condition of space and light. Active manufacturing operations will begin about June 1, 1924.

The new mill is equipped to manufacture light and medium weight wrapping papers, plain and colored, different grades of tissues and specialties in both of the above grades.

E. T. A. COUGHLIN GOES WITH FRANKLIN CO.

Edward T. A. Coughlin, for the past ten years associated with the Monarch Paper Company and Allied Paper Mills, both as superintendent of the coated paper department and in the technical division, has resigned to become general manager of the Franklin Coated Paper Company, Franklin, Ohio. He will leave in a few days to take up his new position, which offers excellent possibilities. He is a graduate of the University of Maine, having taken the special course in papermaking offered by that school. Since his arrival here he has taken a prominent position in the trade, being one of the leaders in the organization of the Michigan division of the American Pulp and Paper Mill Superintendents' Association. He is now vice-president of the national organization. He is a member of the Knights of Columbus and boasts a large circle of intimate friends and acquaintances. Both Mr. and Mrs. Coughlin will be greatly missed and only leave Kalamazoo because of the unusual opportunities offered in the Miami valley district.

TO RETIRE PREFERRED STOCK

The Lee Paper Company of Vicksburg, Mich., originally incorporated with a capital of $1,000,000, of which $500,000 was preferred and $500,000 common stock, will in September, 1925 retire its outstanding preferred stock, which now amounts to $300,000. The plan meeting with favor among stockholders is to issue 5,000 shares of no par common stock, which will be offered common stockholders at 60, thus securing the sum of $300,000 required to take up the preferred stock. This concern has enjoyed excellent business for several years and has been able to operate at close to capacity the major portion of the time.

Wisconsin Mills Make Numerous Improvements

Two New Mills in Process of Construction and Extensions Being Made By a Number of Firms—Most Extensive Building Operations Undertaken Include Those By the Riverside Fibre & Paper Co. of Appleton and the Tomahawk Kraft Paper Co. at Tomahawk—Value of Improvements During Year Well Over Two Million Dollar Mark—Details of Some of the Important Changes Made.

Written Especially for the Annual Number of the Paper Trade Journal By John R. Riedl.

In spite of the huge expansion of the paper industry during the World War and the era of great prosperity immediately following in which several new mills were constructed and nearly every company enlarged its facilities, there has been considerable new mill construction in Wisconsin in 1923. Two new mills are in process of construction, one company enlarged its capacity at least 50 per cent, another company did repair work which practically amounted to rebuilding of its mill and many other companies carried on large construction projects. It is difficult to estimate the value of improvements and new construction in the state started or completed during the last year but it is well over two million dollars.

Probably the most extensive building projects undertaken are those by the Riverside Fibre and Paper Company of Appleton and the newly organized Tomahawk Kraft Paper Company at Tomahawk. The former company is erecting a new paper mill at Appleton to replace an antiquated structure and the latter is building a large plant at Tomahawk where it owns an extensive water power. The former company expects to begin operations in the new plant late in June and the Tomahawk company is hopeful that its new mill will be finished by May 1.

Riverside Co.'s Project

The Riverside company's project includes a machine room large enough for two paper machines, a finishing room, stock room, filter plant and office, the total cost of which will exceed a half million dollars. This company had been considering erection of a paper mill near its sulphite plant, which is at a considerable distance from the old paper mill, for several years and had ordered its paper machine from the Beloit Iron Works more than a year ago. The machine now is being set up in the new plant. As soon as it is in operation the paper machine in the old plant will be moved to the new mill. Most of the equipment in the new mill will be new.

A gravity system for handling pulp from the stockhouse to the paper machines is being installed. The stockhouse is five stories high. All of the buildings are of the most modern construction.

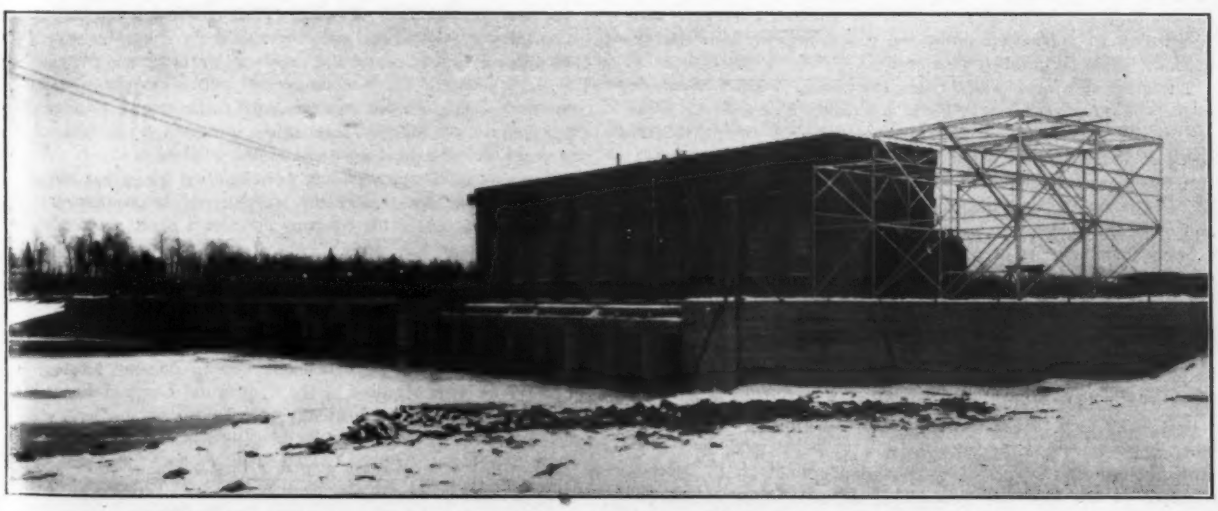
The filter plant, which is located several blocks from the main plant, is completed and is connected with the paper plant by two large pipes. It is large enough to assure a plentiful supply of clean, filtered water for the manufacture of paper. The contract for construction of the new office was awarded only recently and the building will be finished in about a month.

Tomahawk Kraft Paper Co.

The Tomahawk Kraft Paper Company, organized last winter, acquired the property of the Pride Pulp and Paper Company at Tomahawk and immediately made plans for construction of a hydro-electric plant and sulphite mill. The Pride company, organized by officers and stockholders of the Tomahawk Pulp and Paper Company, built a mill which had a distressing experience. It was operated for a time by the Combined Locks Paper Company and then was idle for several months. It was built to make catalog paper for a Chicago mail order company.

Officers of the new kraft paper company are O. Bache-Wiig, president; John F. Rose, first vice-president; S. V. Bugge, secretary and treasurer; A. L. Kreutzer, assistant secretary and treasurer.

The company owns two of the most important water powers in



NEW POWER HOUSE AND DAM OF THE TOMAHAWK KRAFT PAPER CO., AT GRANDMOTHER FALLS.

northern Wisconsin. The first development is at Grandmother Falls.

The original plan of the Pride Pulp and Paper Company contemplated one of the largest mill developments in the northwest. Approximately $3,500,000 was to be invested in buildings and water power and well over a million dollars was spent when the building ceased. The property when it was acquired by the new company consisted of a building 354 feet long and 87 feet wide housing the beater, machine and engine rooms, a boiler house 47 by 98 feet, a warehouse 48 by 300 feet and an office, 48 by 60 feet, and the two water powers at Nigger Island and Grandmother Falls.

The illustration presented herewith shows the new dam and power house of the Tomahawk Kraft Paper Company at Grandmother Falls completed this month. The picture was taken shortly after the gates were first closed and the water commenced to rise. The work of building the camps was started May 1, 1923, and work on the coffer dams was begun June 1. The work was completed March 4, 1924 and the camps were closed on that day.

The equipment consists of three Allis-Chalmers Negel type water wheels direct connected to 1,500 h. p. General Electric vertical generators. It is the first power house on the Wisconsin river equipped with automatic switching control. The power house is located six miles north of the pulp and paper mills now being completed at Wisconsin Dam, two miles north of the city of Tomahawk. It is expected to start these mills May 1 or earlier. The plant will manufacture 40 tons per day of No. 1 kraft pulp and paper. The mills have been built with all the latest improvements and the most up-to-date labor-saving devices have been installed.

Consolidated Water Power and Paper Co.

Probably the largest single item in the constant expansion program of the Consolidated Water Power and Paper Company of Wisconsin Rapids was installation of a giant print machine in the mill at Biron. This machine, in many respects a duplicate of the huge machine in the Wisconsin Rapids division of the company, was built by the Beloit Iron Works which has built all the machines in the Consolidated Company's mills.

Early in the year a proposal was made to the citizens of Stevens Point that if they would assist the Consolidated Company in increasing its water power at the Stevens Point division mill. The company proposed to install a sulphite specialties machine in the mill and make all the other necessary changes and development that the increased capacity would demand, thereby largely increasing the employed force, if the city or its citizens would work with the company but the people of Stevens Point, apparently suspicious of the company and its motives, immediately got into a wrangle which resulted in an announcement by the paper company that the new machine would be installed at Biron.

The giant apparatus, which trims 150 inches, is equal in capacity to the two other machines at Biron and makes it possible to release one of the other machines for different grades of paper. It has a speed of about 800 feet per minute.

A two story brick building was erected adjoining the old machine room to house the new monster. Additional boilers were installed and other equipment was necessary.

Many improvements of a more or less minor nature were made at the Wisconsin Rapids division mill but none was as large as the expansion at Biron. At Appleton, where the Interlake Pulp and Paper Company division is located, one of the large projects was erection of a bleach plant constructed quite largely by the regular mill force. This plant built during the late summer, began operations in the fall.

It is understood that the Consolidated Company is contemplating other improvements at the Interlake mill, including rebuilding of the power house. It is expected also that the visit of H. P. Babcock, manager of the Interlake mill, and Vance P. Edwards, superintendent of the sulphite department, to Europe where they went to study European methods, will mean some changes at the plant. The sulphite room and some other departments are part of the original mill which is one of the earliest in the Fox river valley. The Interlake mill makes Mitcherlich pulp exclusively.

Nekoosa-Edwards Paper Co.

One of the greatest achievements of the Nekoosa-Edwards Paper Company, and probably one of the greatest accomplished by the entire industry in the state, was completion of the Alexander paper mill at Port Edwards. This is called the "wasteless mill" because of the uncommon care taken in designing to prevent waste. It has been said of this mill that 100 pounds of pulp will produce 100 pounds of paper because every precaution has been taken to prevent losses by installation of most modern machinery designed to accomplish the particular purpose for which it is used in the new mill.

While construction of this mill is a 1923 project, yet it was authorized in 1922. In spite of the almost perfect efficiency that has been achieved, a record in mill construction probably was established in erecting this mill. The contract for construction of the building was made about the first week of March and paper making was started the last week in July.

Completion of the new mill gave the Nekoosa-Edwards Company a capacity of about 100 tons a day at each of its mills, making a total of 200 tons every 24 hours. The principal products are news print, sulphite and sulphate wrappings of various kinds, grades and colors.

The Alexander mill contains a new Yankee machine trimming at 120 inches with a speed of from six to seven hundred feet a minute, built by the Beloit Iron Works, and an old machine, known as the "Columbian World's Fair" machine, built about thirty years ago, which was moved from the mill at Nekoosa. A new Yankee machine was installed at the Nekoosa mill.

Niagara type beaters, but with special beater rolls and bed plates were installed in the new structure. All the machinery was installed with the view of eliminating waste as well as securing maximum manufacturing efficiency of high grade papers. B. T. McBain, former director of manufacturing, now assistant general manager of the company, is responsible for the layout of the plant and for designing the machinery. Practically all of the engineering work was done by the company's own engineers.

A three story warehouse was built in connection with the new machine room. The Alexander mill is 185 feet long by 156 feet wide, of concrete, steel and brick construction. It is one of the most talked of mills in Wisconsin, vying with the huge paper machines of the Consolidated Water Power and Paper Company in interest.

Marinette and Menominee Paper Co.

Considerable rebuilding was undertaken by the Marinette and Menominee Paper Company at its mills at Marinette and Menominee. The Park mills and the Menominee mill were gone over completely, concrete replacing wooden structures and machinery was rearranged. The company's production was vastly increased by installation of new paper machines and additions to the sulphite mill.

The company is contemplating new building but it has not been definitely announced whether the work would be at Marinette or at Oconto Falls where the company operates a plant. According to information from Marinette, it was the intention to build in that city but a controversy with the city over the location of a street may lead the company to transfer its new building operations to Oconto Falls.

It has been an almost constant program of rebuilding and remodeling at the Marinette and Menominee Paper Company plants since the properties were acquired by the Continental Bag and Paper Mill Corporation. The mills eventually will be among the largest and most modern in the entire middle west.

Wausau Paper Mills Co.

An engineering feat of considerable magnitude in Wisconsin this year was construction of a new dam for the Wausau Paper Mills Company across the Wisconsin river about 250 feet below an old

dam which was built about 1899. The bottom of the river is gravel and boulders and engineers found the work rather difficult. It was not necessary to delay work in the mill while the dam was under construction.

The new dam is about 330 feet long and 47 feet wide, with a 50-foot apron below, making it 97 feet wide at the bottom. A flume was built into the dam to take another water wheel which can be installed as needed. The structure will develop about 4,000 horsepower, which is an increase of about 25 per cent over the old dam.

The dam was designed by L. A. DeGuerre, Wisconsin Rapids, well known paper mill engineer. Nearly a million feet of lumber and 9,000 cubic yards of concrete was used in the construction.

Other improvements at the Wausau mills during the year included remodeling of the wood room and installation of a dry barker. Other minor improvements and changes were made.

Dam for Dells Paper Co.

The Eau Claire Dells Improvement Company, which maintains the dam furnishing power for the Dells Pulp and Paper Company, Eau Claire, is finishing construction of a large dam across the Eau Claire river. Construction was delayed somewhat by a fire which broke out in midstream during the cold weather, destroying much of the false work, but the damage was repaired and considerable progress has been made. The dam was designed originally to provide for a 26 foot head but provision is made for a 32 foot head which will provide greater power than the company requires. The additional power can be taken by the city of Eau Claire.

Fox River Paper Co.

New power installations costing about $40,000 were made in the Telulah mill of the Fox River Paper Company at Appleton. The first installation was a 750 kilowatt turbine costing about $25,000 and during the summer a 500 horsepower Wickes boiler was set up. The new installations replace some old equipment and also increase the plant's capacity. Numerous changes have been made in the mill since it was acquired from the Kimberly-Clark Company in 1920.

Kimberly-Clark Co.

The Kimberly-Clark Company, constantly engaged in rebuilding and remodeling in its several plants, did not undertake projects of major importance in its mills during the year. Possibly the most interesting single construction was completion of the community clubhouse at Kimberly, Wis., at a cost of about $30,000. In a sense the clubhouse is not complete as this is but the first unit of the complete structure. The building is equipped with a large auditorium, baths, gymnasium, lounging and rest rooms. It was presented to the village of Kimberly with considerable ceremony a few months ago. The company also is erecting quite a large hotel at Niagara, Wis.

Considerable work was completed at the company's plant at Kapuskasing where a 100 ton sulphite mill is located. A fire just about the time the plant was completed caused a considerable loss. No announcement has been made by the company of its future plans for development of its extensive Kapuskasing property.

Stevens Point Pulp and Paper Co.

New equipment valued at about $10,000 was added to the Stevens Point Pulp and Paper Company plant at McDill during the year. The mill was idle a few weeks while the changes were made. The installation did not greatly increase capacity but it did increase efficiency and economy of operation.

Tomahawk Pulp and Paper Co.

A new woodroom was built during the year at the King's dam plant of the Tomahawk Pulp and Paper Company, Tomahawk, Wis., greatly increasing efficiency of operation. Before the woodroom was completed the wood was sent to Wisconsin dam where it was barked, then shipped to King's dam for conversion into pulp and the finished product was reshipped to the Wisconsin dam mill for conversion into paper. Now the barking and sawing is done at King's dam. Some improvements were made on the paper machine at No. 1 mill of the company during the year. Other improvements and changes at the plant were of a more or less minor nature.

Northern Paper Mills

Perhaps the most important expansion projects of the Northern Paper Mills of Green Bay during the past year was completion of a filtering plant with a capacity of 16,000,000 gallons of water every 24 hours, and purchase of the water power and a considerable area of land from the White Rapids Paper Company. This property is located on the Menominee river. It is understood that a hydro-electric development is to be made at the rapids but no definite announcement of the company's plan has been made.

A year ago the Northern Paper mills made many and important changes in the plant and there was considerable rebuilding during the last year. But as a whole there was less paper mill activity in Green Bay in 1923 than in several years preceding.

Straubel Machine Co.

One interesting development in Green Bay during the year was the venture of the Straubel Machine Company, manufacturers of paper mill machinery, into the manufacture of interfolded paper towels and cabinets for dispensing them. The machinery for folding the towels and the cabinet were invented by Louis A. Straubel, who spent two years in experimentation. The work was started on a small scale, with one folding and one cutting machine, but provision was made for additional installations. It is claimed for the new machine that it counts the sheets and labels the packages.

Green Bay Paper Novelty Co.

The Green Bay Paper Novelty Company started manufacture of paper towels during the year, using machinery invented by officers of the company. The company had been making paper napkins and paper table cloths for which there was an enormous demand.

Peshtigo Paper Co.

The Peshtigo Paper Company, following a meeting of directors and officers last July, announced that it would build a large addition to the paper plant and install another paper machine but no announcement was made when this work would be started. There was considerable rebuilding in the wood room of the fiber plant and a system for transferring pulp from the fiber plant to the paper mill was completed.

Valley Paper Mills

The Valley Paper Mills at Neenah, started in 1922, made little progress during the last year. The foundation walls for the main building, and for the power plant and filter plant are completed but work on the superstructure has not been started. It has been stated that construction work will be resumed in the spring but thus far little activity has been shown. The company was formed originally to manufacture glassine papers but later it was announced that opaque and manila papers would be manufactured.

Paper Mill Transfers and Changes

The largest and most important transfers of paper mill property during the last year were the sale of the Pride Pulp and Paper Company to the Tomahawk Kraft Paper Company, sale of the Northern Fiber Company mill at Octonagon, Mich., to a group of men identified with the Marathon Paper Mills of Rothschild, and purchase of interests of other stockholders in the Outagamie Paper Company, Kaukauna, by Judson G. Rosebush.

The mill at Octonagon, started several years ago, was never completed. It was planned originally for a soda pulp mill but it now is equipped for the manufacture of sulphate pulp.

New owners of the mill include D. C. Everest, Cyrus W. Yawkey and Walter Alexander of the Marathon Paper Mills, W. H. Bissell and C. H. Worcester.

Michigan Paper Industry Facing a Big Year

Several Important Expansion Projects Marked Past Twelve Months But 1924 Bids Fair to Prove Doubly Active in the Carrying Out of Contemplated Improvements—Plans for Organization of Valley Paper Co. Expected to Mature Soon—Development Going On at Muskegon—Past Year Marked By Unusual Number of Changes in the Personnel of the Industry—Prominent Figures Removed By Death.

Written Especially for the Annual Number of The Paper Trade Journal By Howard P. Hall.

What does 1924 promise in expansion of the paper industry in Michigan? That is an interesting question to ask before considering the happenings of the past 12 months. Three projects of the first importance are assured, while indications point to the development of two others of equal moment.

As usual, when papermaking is talked, Kalamazoo occupies the spot light. There is no indication whatever that this city will lose its preeminence in that particular line. Felix Pagenstecher, president of the Bryant Paper Company, has officially announced that he intends to follow the campaign of improvement just completed at the Superior division, by similar efforts to bring the Bryant division up to the highest grade of efficiency and to restore it as a model, up-to-date mill. This will necessitate an outlay of approximately $500,000 but promises to be money well spent when one considers the reduction in costs of operation and the increased output.

L. W. Sutherland, president of the Sutherland Paper Company, has awarded to the O. F. Miller Company the contract for an addition that will double the capacity, of the concern's boxmaking unit. The new structure will have a floor space of 58,000 square feet and will necessitate an outlay of $100,000 for building and equipment. It will make this one of the largest plants of its kind in the middle west.

Another assured addition to the list is the plant for the Dunn Pulp and Paper Company, at Port Huron. Billingham and Cobb, local engineers, have finished the plans for this plant, a one machine mill. The contract is to be awarded immediately. It will cost completed about $750,000.

Organization Plans to Mature

Returning to Kalamazoo and the fourth proposition there is every indication that the plans for the organization of the Valley Paper Company will mature in the next 60 or 90 days and work start on the erection of that plant. Business and financial conditions have been none too rosy in this community the past winter. This has influenced George O. Comfort, president of the new concern, to move cautiously in his organization campaign. He has nevertheless made steady progress towards his goal and, despite many efforts of more energetic communities to secure this industry, Kalamazoo will in all probability get the mill. It naturally belongs here.

Another project that has set local tongues wagging is the announcement that the Standard Paper Company has purchased a large tract of land adjoining its present plant. It is a five acre plot with adequate railroad facilities. B. C. Dickinson, president of the company, when asked "what's up?" only replied "we have bought the land. Further than that I am unable to divulge our plans or intentions for the future." That was enough to indicate that he has something up his sleeve. For many years the Standard Paper Company has been one of the most consistent money makers in the Kalamazoo valley district.

Another evidence of the virility of the industry is found in the list of important expansions made during the past year, the papermaking fiscal year that opens in April and closes in April, dates set by the annual meeting of the American Pulp and Paper Association.

Again Kalamazoo and the Kalamazoo valley district are distinctly in the lead with important building, expansion and improvement programs chronicled by the Kalamazoo Vegetable Parchment Company, Bryant Paper Company, Western Board and Paper Company, Allied Paper Mills, Kalamazoo Paper Company, Watervleit Paper Company and the Eddy Paper Company. Added to these are the expansions made by the Central Paper Company, Muskegon, and the Filer Fibre Company, Filer City.

Monroe, specializing in board production and first in the manufacture of board not only in Michigan but in America, suffered due to the dullness in the board market. While the mills were operated steadily, no reports are made of any notable extensions to any of the plants there. The outlook for the future seems more favorable and a resumption of expansion programs prevalent during the past five years may again be looked forward to.

A Construction Record

A record in paper mill construction and reclamation in the Kalamazoo valley district was established when Monday night, March 31, shortly before midnight, the big Fourdrinier machine in the Superior division of the Bryant Paper Company resumed operation after a shutdown of three months and one day.

In the period intervening since Sunday, December 30, this unit of the giant industry, declared personally by President Felix Pagenstecher to have deterioriated to an old type mill, has been restored to a modern plant of the most approved efficiency and capable of operation in the future at a satisfactory profit.

Incidentally V. D. Simons, mill engineer with offices at 39 South LaSalle street, Chicago, author of the plans for reclamation, chuckled a merry chuckle. Not only had he delivered the goods from the standpoint of merit, but by a few minutes he had exceeded the time limit for the job, thus winning a wager of 100 smilers or thereabouts.

The work accomplished was for the time required monumental. It included the erection of a new conversion plant from the ground up; the rebuilding of the machine room and beater room; erection of new piers and foundations in the basement; demolition of the old power house and the removal of steam engines, line shafting and antequated drives for paper machines and auxiliary machinery, also the removal of an immense amount of equipment that has become useless by the adoption of the new order of things.

All that remains to be done is to finish painting the interior of the structure and the completion of numerous small odd jobs, none of which will in anyway interfere with the operation of the plant. It is now a certainty that next week the second and smaller machine in the mill, a Harper Fourdrinier, will be running in unison with its larger companion.

The immense amount of steel, concrete and masonry construction

required with this program was handled by Ray D. Boyer. He pushed his men to the limit and was able to keep up with the requirements outlined by Chief Engineer Simons and assistant Frank Gilligan.

New Conversion Plant

The most notable feature of the work accomplished is the new conversion plant, housed in a reinforced concrete and steel building, three stories high and 160 by 47 feet in dimensions. It embodies features never before seen in the Kalamazoo valley district, being in reality a pulp mill in which a high grade pulp is manufactured from waste papers, book and writing stock being used exclusively.

The sorting room is on the third floor, a light, airy, comfortable apartment, where working conditions are ideal. It is direct connected to the stock house. The sorted stock is fed by traveling carrier into the shredder and then dumped automatically to a hige mixing beater on the second floor, from which in turn it drops to mammoth ten-ton cooking vats in the basement. By pump it is then carried back to the second floor and onto the riffle boards of the washing machine. Grimy at first, it passes through three waters and is pumped to an auxiliary washer for the final operation before going straight to the beaters, jordans and paper machines in turn.

By this system the former battery of rotary boilers, cookers, bleach vats and small washers is entirely eliminated, two men handling the work that was formerly done by 25 to 30, while the task is much easier and more inviting. There is at the same time an enormous annual saving in power costs.

This single conversion plant operating 24 hours a day has sufficient capacity to supply not only the needs of the two Superior machines for stock, but in addition the five machines in the Bryant division, thus eliminating in the latter unit three sorting rooms and a vast galaxy of auxiliary machinery and equipment that will in a short time be thrown into the discard. By a very simple device the washed stock is pumped from storage vats in the Superior mill, through a ten inch wooden pipe underground to the beaters supplying machines 1 and 2 in the Bryant unit, and will later similarly care for the needs of machines 3, 4 and 5.

Another step in this improvement campaign has been the improvements to the beater and machine rooms. Both these departments are completely made over. The roof of the beater room has been raised and a long lighting cupola added. Washers have been thrown out and beaters re-assembled so they can be driven efficiently by motors. In the machine room large windows have been put in at each end and dormer windows on the sides, making this apartment light and airy. New concrete floors have been laid and all old line shaft drives have been replaced by motors. Both machines have been completely overhauled.

Boiler House Wrecked

The old boiler house has been wrecked and boilers and engines scrapped. Power for the Superior is furnished from the new central power plant, the steam passing through an immense pipe carried on steel towers. This pipe is insulated with three inches thickness of asbestos and is guaranteed to be impervious to outer cold.

Improvements in the basement include the erection of new concrete piers and foundations and huge stock chests of concrete for the storage of manufactured pulp. All the old machinery is being eliminated. The interior finish is in a white and grey enamel.

"We are glad to resume operations in the Superior division," said President Pagenstecher, "thus getting some income in place of all outgo. It is our intentions to operate this unit as a specialty mill, it being adapted for that purpose. We will look to the other divisions for quantity production.

"Our Superior, Milham and Imperial divisions are now in splendid condition, but the old Bryant division needs attention and will be the next to be improved and brought right up to date. That work will start immediately and pushed as rapidly as possible.

"The aim is not only to increase production, but quality of our output as well. At the same time costs are being carefully considered. We will effect an immense saving in power and labor through our new conversion plant. It is becoming more and more difficult for the American manufacturer to secure common labor, therefore he must rely on automatic machinery. Particularly is that true if he is to successfully meet foreign competition. Second generation of Americans are no longer satisfied to be classed as common labor. That also has to be considered. The growing demand for workers covers every field of activity. There is no longer an abundance of cheap help in any industry."

The improvements completed at the Superior division and those contemplated for the Bryant division are made possible by the erection of the new central power plant by the Bryant Paper Company. This unit, equipped with four boilers, will replace four boiler plants with 24 boilers installed and, like the new conversion plant, will result in a great saving in coal and labor.

More Important Expansion

Admittedly more important than the rebuilding of the Superior mill, but less spectacular in its accomplishment, is the great expansion program carried out at the Kalamazoo Vegetable Parchment Company. This includes the erection of the new model paper mill for two machines, one machine being already installed; a new power plant; the reconstruction of the Glendale division; a complete new water supply system, the largest and finest in the world for industrial purposes and many improvements to the original parchment division. This work has been in progress for two years and is probably the biggest single forward step yet accomplished in the development of the paper industry in this valley.

January 1 the Western Board and Paper Company started its reconstructed plant, one of the best one-machine board mills in the middle west. Through the medium of improvements made, the plant has a daily output of about 90 tons a day as against 60 tons in the past. At the same time Manager Winship A. Hodge declares the quality of the product has been generally improved.

An addition, 51 by 60 feet, was erected, the main floor being devoted to manufacturing, the second floor to a well equipped office. The board machine was changed from five cylinders and 75 driers to seven cylinders and 111 driers. Seven new screens were installed, also two large Shartle Brothers jordans and two 1,800 pound beaters from the Dayton Beater and Hoist Company.

A two cylinder 12 by 12 Chandler and Taylor engine drives the machine. Three other engines were rebuilt and capacity enlarged. The power house was extended 50 feet and a 500 horse power Wickes boiler installed.

Allied Paper Mills has completed extensive improvements to the King, Monarch and Bardeen divisions. In the first instance the nine coating machines have been overhauled and speeded up and a new floor and ventilating system installed. Paper machine No. 4 has a new settling tank for the economical handling of white water. New variable and constant speed engines have been installed in the three divisions, while the King Power plant has been increased in boiler capacity by two 500 horse power Wickes boilers, equipped with Superheater Company's superheaters and type E stokers. The flume has been rebuilt at the Bardeen division and a new roof installed on the beater room of the Monarch division.

The Kalamazoo Paper Company expended $200,000 to $300,000 in the maintenance of its plant at high efficiency mark, the improvements including a new 5,000-ton clay storage house and a stock house for the Riverview paper mill, two large structures that are lost in the maze of buildings making up this great concern.

Three Rivers Improvements

When the Eddy Paper Corporation of Illinois took over the Eddy Paper Company of Michigan one of the first steps was to make many improvements in the mills at Three Rivers and White Pigeon,

all of a nature tending to better the equipment and reduce costs of operation.

At Three Rivers a large continuous breaker beater has been installed and the Fulton Condensate system made regular equipment for the two machines in the new mill. A broke beater has also been installed in the basement to better handle trimmings from the machines. A new building increases the roll storage 60 per cent and a large traveling crane added. A major portion of the machinery in the fiber container division has been re-located. A complete new white water system has been added to mill No. 3.

At White Pigeon the capacity of both machines has been increased by the installation of additional driers and cylinders and the Fulton Drying System. Machine No. 2 has a new jumbo winder for handling larger rolls. The white water system has been improved, allowing for saving in stock while the power distribution system has been changed materially for the better. Numerous mechanical betterments are also introduced in the coating mill and box division.

The past year has seen numerous improvements made at the plant of the Watervleit Paper Company. Most important has been the installation of a 2,200 horse power uniflow Nordberg engine, increased boiler capacity and more electric power, all necessitating an outlay of over $100,000.

Expansion at Muskegon

Up at Muskegon the Central Paper Company is completing a campaign of expansion in both its paper mill and pulp division. In the paper mill a 144 inch Bagley and Sewell Fourdinier has been added to a battery of two 96 inch and one 120 inch Fourdriniers, increasing the daily output from 65 to 120 tons. The new machine runs almost exclusively on No. 1 kraft paper.

Three digesters have been added to the sulphate mill. New Badenhausen boilers replace the Babcock and Wilcox battery. The reciprocating steam engines have been taken out and steam turbines added. Nearly the entire bill has been electrified.

During the past twelve months the Central Paper Company has engaged in an extensive building campaign which includes the erection of six concrete and brick structures. One building is 165 by 50 feet; one building 150 by 75 feet; one building 50 by 40 feet; one building 270 by 50 feet; one building 45 by 90 feet, and one building 90 by 90 feet. The entire plant is in first class condition.

Another new mill on the east Lake Michigan shore is that of the Filer Fiber Company, at Filer City. It was completed last fall and has since been in steady operation, turning out an excellent quality of kraft paper. The mill is equipped with a 160 inch Fourdrinier, the daily capacity being 90,000 pounds.

As result of a fire late last year, the Michigan Carton Company, Battle Creek, has been engaged in rebuilding its stock house, replacing an old wooden structure with a new concrete and brick building.

Many Changes in Personnel

Death and retirement have combined during 1923 to cause many changes in the personnel of the Kalamazoo valley paper industry. A notable incident of the former was the passing of George F. Bardeen, who during his years of activity was one of the best known paper mill executives in America.

He was the founder of the Bardeen Paper Company, Otsego, also active in the organization of the Wolverine Paper Company, MacSimBar Paper Company, Lee Paper Company and the Otsego Coated Paper Company.

Another case is that of the late M. B. McClellan, former president of the MacSimBar Paper Company, and son-in-law of G. E. Bardeen. Peter V. King, at various periods associated with Tileston and Hollingsworth, Boston; Combined Locks Paper Company, Appleton, Wis., and the Monarch Paper Company, Kalamazoo, died a few months ago, as did Frank D. Haskell, son-in-law of the late Samuel A. Gibson and one of the best known mill supply dealers in the middle west.

The above deaths call attention that the grim reaper has been unusually busy during the past three years in local paper mill ranks. Beginning with the death of Frank H. Milhan, former president of the Bryant Paper Company, others to follow in comparatively rapid succession are John F. King, president of the Rex Paper Company and for 35 years actively associated with the growth of papermaking in this section; Noah Bryant, vice-president of the Bryant Paper Company and for sixty years a resident of Michigan, following the late Samuel A. Gibson west to Kalamazoo; Allen A. Wheat, manager of the Northern Michigan Pulp Company and widely known in Michigan, Massachusetts and Ohio; Hale P. Kauffer, director and one of the founders of the Bryant Paper Company; John Russell, former superintendent of the Bryant Paper Company; Robert W. Hemphill, one of the founders of the Peninsular Paper Company, Ypsilanti; John H. de Morainville, secretary-treasurer of the Hoskins-Morainville Paper Company, Menominee, and E. Golden Filer, president of the Filer Fibre Company, Filer City.

Oscar Gumbinsky, one of the founders of the Eddy Paper Company has since that concern was taken over by the Eddy Paper Corporation of Illinois, retired as director and sold most of his extensive holdings. His brother, Nathan Gumbinsky, has followed his example. For many years Oscar Gumbinsky and Brothers were leading paper stock dealers in the Kalamazoo valley. They are no longer engaged in that line, their local interests now being in the hands of the Kalamazoo Trading Company.

Arthur L. Pratt, for years president of the King Paper Company and later member of the board of directors of the Allied Paper Mills, still retains his financial interests but has at his own request retired from any active participation in the management. It was at the annual election in January that his name was stricken from the list of directors.

CHICOUTIMI DEAL ATTRACTS ATTENTION

In financial circles and in the pulp and paper districts attention is turned towards the Chicoutimi and Lake St. John district, where between now and the end of next month developments of great magnitude as a result of the liquidation of Chicoutimi Pulp are forecast. Lord Rothermere, the English newspaper magnate, is due in Montreal this week, while Sir William Price, who is still abroad, will arrive in the course of April. Both are well known to be following closely the recent development in the Chicoutimi pulp group. It is thought the two interests will combine to take over the company, if any advantageous proposition is made or the opportunity of a profitable deal seen. While these reports are current here in semi-official circles, it is learned from the liquidators of the Bay Sulphite Company, the fate of which is closely linked with Chicoutimi pulp, that the mills of the former in Chandler, which have been closed down since the liquidation, are to reopen at the end of next month whatever may be the development. The receivers will operate the mills and thus prevent conditions in that district from growing worse as much hardship has been encountered by the employees. This operation of the mill, however, will only be of a temporary nature. Even if the Chicoutimi pulp group should be taken over by Price Brothers' interests or through a syndicate headed by Sir William Price and Lord Rothermere, it is understood that certain difficulties will arise. It appears that there is a strong movement against the merging into one large company or the control of all the Lake St. John, Chicoutimi, and Saguenay districts pulp industry by one group and some intervention may come to support the interests, who have headed the Chicoutimi Pulp. Large banking interests are interested in the developments, and there is no doubt that steps are to be made to come to some working arrangement.

John A. Frost, for some time traffic manager of the National Paper Products Company, Carthage, N. Y., has been advanced to the position of general sales manager of the company to succeed J. J. C. Downey who has resigned.

Quebec's Views on the Paper Situation

Manufacture of News Print Regarded at Present Time as One Bright Spot in Canadian Pulp and Paper Industry—Many Feel That Capacity Has About Been Reached in Expansion That Has Been Going on—Development of Water Power a Major Issue With the Industry—Past Year Has Witnessed Many Changes in Pulp and Paper Enterprises—Large Paper Mill Mergers Likely to Be Perfected at Early Date.

Written Especially for the Annual Number of the Paper Trade Journal by C. L. Sibley

The one bright spot in the pulp and paper industry in Canada at the present time is the manufacture of news print. In all other lines more or less uncertainty prevails owing to conditions which will be dealt with presenting, but as regards news print the past year has seen all the mills producing at capacity and there seems to be a good prospect that, despite increased capacity during recent months, the demand will continue to absorb production. This prosperity is due entirely to the great demand for news print in the United States. Outside of the United States, the market for Canadian news print has been disappointing. European countries have practically monopolized the market in South America and the prices there are too low for Canadian mills to compete. In Australia, owing to the operation of a preference granted to the paper made in Great Britain, the market has been practically lost to Canada, while shipments, both to New Zealand and South Africa, have been below those of the previous year. The result, as officially reported by the Canadian Pulp and Paper Association, is that Canada's trade in news print in overseas markets has become insignificant and Canada is almost dependent on the market in the United States. The rapid increase in the production of news print in Canada is shown by the following returns:

Year	Production
1920	875,696 tons
1921	805,134 "
1922	1,081,364 "
1923	1,166,225 "

The exports of news print amounted for the year 1923 to 1,043,139 tons, of which no less than 1,021,558 tons went to the United States.

Expansion Nearing Limit

The remarkable expansion which has been going on in the industry during the past year or so has now raised doubts in the minds of the producers as to whether capacity is not about reaching the limit of demand, and there are those who think that serious consideration will have to be given in the not distant future to the question of curtailing further expansion. During the year 1923 six new news print machines commenced operations—two at the St. Lawrence Paper Mills, Three Rivers; two at Fort William Pulp and Paper Company, Fort William; one at Belgo Paper Company, Shawinigan Falls, and one at Bathurst Company, Bathurst, N. B. Since the beginning of the year three other machines have commenced to make news print, namely, one at the Belgo Company's mills, one at Kenora and one at Donnacona. These three machines have added another 285 tons to the daily capacity of Canadian mills and it is satisfactory to note that their production is all taken care of for this year.

As regards wrapping papers, a fairly satisfactory year has been experienced, but during the past three months there has been considerable competition in kraft paper from Scandinavian mills and this has forced down the prices of all wrapping paper to a point beyond which reduction cannot be made without the elimination of the entire profit. The new machine of the Dryden Paper Company came into operation during the year and thus there was a small increase in the total capacity of the wrapping paper mills.

As regards book and writing papers, the new machines brought into operation during the year have increased the capacity to 75,000 tons of book, bond and fine papers annually. This is far in excess of the domestic demands and there is considerable uncertainty as to the prospect of opening up new markets. In Canada the British tariff has been increased and this has allowed British manufacturers to undersell Canadian mills in their own market. In regard to foreign markets, the competition is such that no great expansion of exports can be looked for.

The production of fiber boards is increasing but here again the opening of news markets abroad is necessary unless production is to be curtailed.

As regards the manufacture of pulp this past year proved a very fortunate one for the producers of mechanical pulp, as low water conditions in New England during the early part of the year and the prolonged strike in Scandinavia greatly increased the demand for the Canadian product. Scandinavian competition is now being felt and unless there are further conditions which may be described as lucky during the present year the prospects do not appear to be any too good.

The demand for sulphite pulp by the United States has not fulfilled the hopes of producers in this country and here again Scandinavian competition is making itself felt in increasing measure. Low labor costs in Northern Europe, depreciated exchanges and cheap ocean transportation are the chief obstacles to the Canadian manufacturers and it is considered that there will be no betterment as long as the present chaotic conditions in Europe exist.

Altogether, the general opinion in the industry here is that the whole industry is entering upon a difficult period in which much attention will have to be given to even more economic production in order to build up business in outside markets without which the mills here cannot prosper.

Water Power Becomes a Major Issue

By far the most important question which has come up during the year as affecting the pulp and paper industry in Eastern Canada is in regard to the policy which shall govern the future development of water power in this country. Largely as a result of the scheme put forward for the joint development of the St. Lawrence by the United States and Canada, the question of policy in this regard has become a major issue. Primarily the development of the St. Lawrence is still spoken of as a navigation problem, but it seems beyond dispute that the navigation end of the scheme is only incidental, and that the main object is to harness the enormous water powers of the St. Lawrence. If this were done under international auspices there would be enough power and to spare, for generations to come, not only for the pulp and paper industry in the eastern half of this continent, but for all other industries as well. Naturally under such a joint development, the power would be divided between Canada and the United States, and the shortage of power in New

England pulp and paper plants, and others plants as well, would become a thing of the past.

Whatever may be the feeling in the United States on this question, there can be no doubt whatever that Canada is divided beyond any hope of reconciliation in regard to the project. The people in the three Prairie Provinces are generally in favor of the scheme, because they are being led to expect that it will result in a cheapening of transportation charges on grain, and also because they think it will permit of ocean vessels travelling up to the head of the Great Lakes. Shipping men strenuously deny that either of these hopes are practicable. The present canals, they say, could easily carry three times the present traffic, while the idea of ocean vessels wasting their time on inland canals is out of the question.

The people of Ontario are practically a unit for the project, not only because the thought of Toronto being made an "ocean port" is flattering to them, but because above all they wish to see the St. Lawrence harnessed, and cheap electric power made available all over the province.

Here, however, a complication comes in. By far the greater portion of the St. Lawrence river flows through the Province of Quebec, and any idea of sharing that waterway with the United States is abhorrent to the province. Under the British North America Act the provinces own the beds of all navigable rivers, and the Dominion Government's jurisdiction only extends to navigation. The Quebec Government holds that it alone can grant power for the erection of dams on the St. Lawrence where it flows through Quebec territory, and that it alone has the right of governing the development of water power.

Quebec Hostile to Plan

Quebec's position in this regard was laid down in most determined language in the Legislature only last month by Premier Taschereau, when he said that no matter what Government was in power at Ottawa, the Province would protect the water power which belonged to it, and would fight to the last ditch in defence of its rights. It would fight with equal determination against any dam on the St. Lawrence, even if that dam were outside the province, if such a dam would lower the level of the river even by an inch.

Thus if the development of the St. Lawrence should become a real political issue, Quebec Province will undoubtedly be unalterably opposed to it, and some even think Quebec would secede from the Confederation rather than be a party to any plan by which the river would be developed by joint authority as between Canada and the United States.

This St. Lawrence scheme has also had the effect of focussing the attention of the Quebec Government on the whole question of exporting water power from the Province. The Quebec Government has evolved a policy of its own for the development of water power. Instead of developing those powers as a State enterprise, as is the case in Ontario, the Quebec Government builds its own dams for the conservation of water, and sells the water on a rental basis to private companies who undertake development. This plan is working out satisfactorily both to the Government and to hydro-electric companies. During the past year, however, the Provincial Government has developed this policy by a plan under which double royalty on water will be charged for every horse-power exported from the Province, whether to other Provinces or to the United States. The possibilities in this connection in any development of the St. Lawrence are obvious. The main purpose, of course, is to keep the power within the Province for the building up of industries here.

Big Developments Under Way

Meanwhile big developments are under way in the Province of Quebec in the development of waters powers and the establishment of further pulp mills. The Provincial Government has already spent $2,500,000 on water conservation on the St. Maurice River, and this spring another $500,000 has been voted for additional works on the river. In this connection it may be noted that the St. Maurice Power Company, a Shawinigan Water and Power Company subsidiary, is carrying out a new development on the St. Maurice river at La Gabelle, where 150,000 horsepower is to be developed, bringing the total power resources of the Shawinigan Company to 497,500 horsepower. The first unit of 30,000 horsepower will be available early this year, and the remainder before the end of 1924.

The Provincial Government has just voted another $950,000, or $2,750,000 in all, for the conservation of water for power development on Lake Kenogami, where large water powers are to be developed.

By far the largest water power development in the Province now under way, however, is that at the Grand Discharge, at the head of the Saguenay River, where, according to Premier Taschereau, something as wonderful in its way as Niagara will be produced. At least one million horsepower will be developed here. One of the most important developments in Canadian corporate history is contained in the recent announcement that Price Brothers & Co., the well-known paper manufacturers, now own a 25 per cent interest in the Quebec Development Company, which is carrying out this development. The capitalization of the Quebec Development Company is $25,000,000.

Another dam which the Quebec Government now has under construction is on the Riviere du Loup. This will supply water for development by the Algonquin Power Company, which is capitalized at $2,000,000.

One of the most important contracts entered into by the Quebec Government during the year includes both the development and the operation of another of the great water powers on the North Shore of the Gulf of the St. Lawrence. The contract was secured at public auction by the Ontario Paper Company. The transaction involves the lease of 2,500 square miles of timber limits and the rental of the first water falls on the Outardes River. The company must not only develop 150,000 h. p., but must construct and operate within seven years a paper mill capable of producing at least 100 tons of pulp per day.

The Quebec Government has also leased rapids on the Megiscane River to a syndicate headed by L. N. Huard, of Levis, Que. Here the power is to be developed and a pulp and paper mill erected.

At Godbout, Que., the St. Regis Paper Company had been granted rights for the development of power, and a contract for the development, at an expenditure of around $100,000 has already been awarded. The company will erect a pulp mill there.

At Back River, between the island of Montreal and the mainland, J. R. Walker, of the Back River Paper Mills, and other parties are at work on plans for the development of some 50,000 h. p.

New Pulp and Paper Mill Features

Among the features of the past year in connection with well-established pulp and paper enterprises has been the severance of relations between the Chicoutimi Pulp Company and allied interests and Becker & Co., Ltd., London. This company went into receivership at the end of last year. Becker & Co. were the selling agents of the Chicoutimi Company in England. Owing to divergence of views the ten-year contract was cancelled. Sir Frederick Becker thereupon claimed that investments amounting to one and a quarter million pounds sterling which he and his associates had made in the Chicoutimi interests had been wiped out, but this has been officially denied by Senator Beique, who says that an audit of the books of the Saguenay Pulp and Paper Company and its subsidiary the Chicoutimi Pulp and Power Company, showed a large balance against Becker & Co. Meanwhile it is likely that there will be a reorganization of the entire concern.

The affairs of the Riordon Company, which was badly hit by the after-war slump, have also occupied considerable attention. Various schemes for reorganization have been considered. Ultimately the liquidation of the company was decided upon as necessary to a formal reorganization, but subsequently it was announced that owing to lack of financial support the reorganization had been abandoned,

and the bondholders' committee decided to carry on the concern prior to another plan being evolved. It is believed here that the concern will finally work out on a satisfactory basis, but that there is a lot of hard sledding yet to be done.

One of the important events of the year has been the transfer of the Belgo Paper Company from Belgian to Canadian control. Under the re-arrangement Hubert Bierman, formerly managing director, has become president, and Sir Herbert Holt, the president of the Royal Bank, and one of the richest men in Canada, has been appointed vice-president.

In August last the first news print mill in New Brunswick, that of the Bathurst Company, of Bathurst, N. B., came into operation. It is now producing at capacity, and is giving great satisfaction to the shareholders.

A new tissue paper mill has been established at St. Andrews, Que., by the Western Quebec Paper Mills. It has a capacity of 1,800 tons a year.

The Donnacona Paper Company, of Donnacona, Que., has increased its common stock from $1,500,000 to $3,000,000, and has enlarged its news print capacity to 60,000 tons a year.

In New Brunswick preliminary work on the construction of a large pulp and paper mill is being done by Hollingsworth & Whitney, of Boston, which has acquired extensive limits on the St. Croix River. The plant will be at St. Stephen, N. B.

At Sheet Harbor, N. S., a pulp mill is being erected by the Albany Perforated Wrapping Paper Company, of Albany, N. Y. The company has 60,000 acres of timberland in the vicinity.

At Cornwall, Ont., an artificial silk factory is being erected by the well-known silk firm of Courtlands, Ltd., of London, England. The Kipawa Company, a subsidiary of the Riordon Company, has been very successful in the manufacture of artificial silk from wood pulp, and their product will likely be sold to the new silk factory.

An entirely new departure in the manufacture of blotting paper was recently forecast by the Forest Products Laboratories in Montreal. The best grades of blotting paper have hitherto been made of rags, but the laboratories have succeeded in making a paper with excellent absorptive powers entirely from wood pulp.

Plans are now under way for the manufacture of high grade paper from the straw produced on the western prairies and now burned. It is stated that a mill is to be established somewhere west of Winnipeg in the near future.

Huge Mergers Discussed

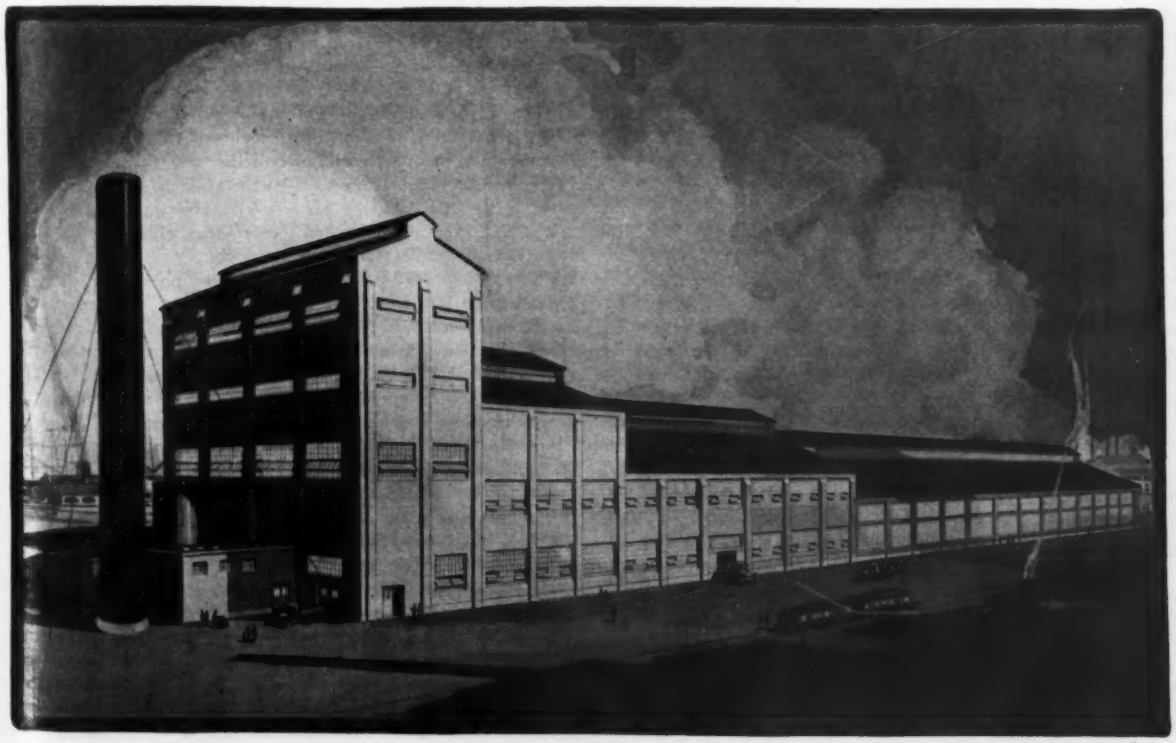
Several huge mergers of paper mills in Canada have been prominently discussed for months past. The most important concerned the mills in the St. Maurice Valley, notably the Belgo, St. Maurice, Wayagamack, and Laurentide. Up to the time of writing nothing has come of the negotiations which apparently have been in progress owing, it is said, to the various interests, and particularly Laurentide, not being able to agree on terms.

New President of Abitibi

A notable figure in the paper trade in Canada passed away in November last in the person of H. F. Anson, president of the Abitibi Company, and one of the founders of that organization. He has been replaced by Alexander Smith, of Chicago, head of the investment house of Peabody, Houghtaling & Co., of Chicago, who has been identified with the company since its inception and is one of the two largest individual shareholders.

A. W. TAUBE GOES WITH VERNON BROS.

A. W. Taube, formerly with Marquardt, Blake & Decker, will become connected with Vernon Brothers, paper merchants, 66-68 Duane street, New York, and will specialize in the sale of book and coated papers to publishers and printers. Mr. Taube was for many years in charge of the manufacturing of the Frederick A. Stokes company, publishers, and has therefore a wide range of experience in handling publishers requirements.



PLANT OF THE COLUMBIA RIVER PAPER CO. AT VANCOUVER, WASH., DESIGNED BY THE AUSTIN CO., CLEVELAND, OHIO. IT WILL BE THE FIRST MILL TO MANUFACTURE PARCHMENT PAPER ON THE PACIFIC COAST.

Ontario Paper Industry Flourished in 1923

Pulp and Paper Mills Report Satisfactory Returns from the Year's Business and News Print Situation Throughout the Twelve Months Was Gratifying—Many New Plants Sprung Into Existence and Year Was a Notable One from the Standpoint of Expansion—Much Consideration Given to the Subject of Preservation of Timber Wealth and as Result Reforestation Is Live Issue.

Written Especially for the Annual Number of the Paper Trade Journal By G. W. Brock.

The past year was one of fair returns with the pulp and paper mills in Ontario, business picking up more within the last few months than during the first half of 1923. News print plants were well employed, and the demand was steady, distribution normal and production costs kept on a firm basis. Practically all plants turning out print paper had a satisfactory year and showed a profit well in advance of that of the preceding twelve months.

It is a close race between Ontario and the sister province of Quebec for supremacy in the pulp and paper trade, with Quebec holding the edge, because of its leadership in the production of pulp of all kinds. Ontario, however, is in advance in the output of paper, and during 1923 produced 648,348 tons, valued at $50,927,499, as compared with Quebec's 587,777 tons, valued at $45,866,028. Ontario turned out the most news print, the most book and writing paper and box board of different varieties. Quebec produced the most wrapping paper.

The leading news mills of Ontario are those of the Spanish River Pulp and Paper Mills, with three plants yielding 700 tons daily; the Abitibi Power and Paper Company with 500 tons daily (being the largest mill under one roof in the world); J. R. Booth, 145 tons; Fort William Paper Company, 160 tons; Ontario Paper Company, 300 tons; Fort Frances Company, 150 tons; and the new mill of the Backus-Brooks Company at Kenora, with an initial output of 100 tons. The daily production in Ontario is about 2,100 tons, which is about forty per cent of the entire daily output of the Dominion, averaging around 5,200 tons. It is expected that, by the end of the present year, the per diem capacity of all the news plants in Canada will be 5,600 tons, as, with the new machines being installed, over 400 additional tons will come on the market in 1924.

The other branches of the paper business did not enjoy the same expansion and development as news print, although, for the most part, business was better than in 1922. The plants operated at from 70 to 80 per cent capacity, but were handicapped owing to orders being small and placed only as required. The comparatively quiet trend of other lines of business resulted in a diminished consumption of books, writing bond, wrapping and kraft papers. Business has, however, loomed up better in 1924, and during the first three months of this year profits have shown an increase. The production of grades of paper other than news print, depends to a large extent on domestic demand, as only a small portion of the output is exported. Of news print 85 to 90 per cent is shipped out of the country. The exports of book, bond, wrapping and boards was, however, above the level of 1922, which is a healthy sign. Manufacturers look for steadily improving demand from this out. Production expenses are well stabilized, pulp is much lower in price and a supply of coal and other raw materials is obtained under more favorable circumstances than was the case a year ago.

Prices have ruled fairly firm with the exception that wrappings and kraft are from one-quarter of a cent to a cent less than at this period in 1923. The pulp mills have had a rather trying experience and a number are in liquidation or in the hands of a receivership. The companies making news print and book and writing papers are for the most part in good shape and backed by well-equipped plants, ample capital, increased reserves and splendid selling organizations. This does not apply so generally to concerns turning out mechanical and sulphite pulps.

Meeting the Profit Problem

For the past two or three years Canadian producers of pulp have been faced with the problem of how to make a fair operating profit, confronted as they are, with the dumping in the American market of steadily increasing quantities from Norway, Sweden and the Baltic pulp plants. Ground wood pulp is today selling from ten to fifteen dollars less a ton than it was a year ago, and bleached sulphite from fifteen to twenty-five dollars less, with fully as great a reduction in the easy bleaching variety. If the European troubles were adjusted, the depreciation in foreign currency overcome and a healthy flow of trade and commerce brought about, there should be a profitable market for the product of the pulp mills in Ontario and the other provinces of the Dominion.

According to Major J. I. Hart, of Toronto, Inspector of Crown Timber Agencies, the output of the logging season for the past winter from the Crown lands of Ontario will be 408,000,000 feet of timber, 3,176,000 railway ties, and 649,700 cords of pulpwood. There were thirty thousand men employed in the camps, and the revenue that the provincial government will derive in dues will be $3,500,000. The money paid out in bringing the logs and pulpwood to the mills will be $21,876,000. This figure does not take in the cost of manufacture, or the revenue, which the railways of Ontario will receive for freight and the money made from converting the logs and pulpwood into finished products.

During the last fiscal year there was sold by the Department of Lands and Forests of Ontario timber areas totaling 1,593 square miles. The number of sales transacted was 47, considerable of this territory being burned over country. The number of forest fires have been decreasing of late years owing to more vigilant protective measures and larger forces of fire wardens and aerial oversight. In 1920 there were 31 fires in the province, with a loss of $217,000; in 1921, 38 fires, with a loss of $195,000, and in 1922, exclusive of northern Ontario, eight fires, with a loss of $80,000. It has been asked how much of the loss represented pulpwood, but this is a question which no one can intelligently answer, for the simple reason that, in every bush and forest fire, the settler has a small pile of wood that is consumed and never insured, and obtaining accurate figures is, therefore, impossible.

In regard to fires, it may be stated that the Ontario government will this year have thirteen hydroplanes to patrol the forest areas of the province. The aim of the provincial authorities is to encourage capitalists, who are investing money in pulp and paper enterprises, sawmills and timber limits, by safeguarding their holdings from conflagrations. The Ontario government does not intend to dispose of any more large timber and pulpwood areas

until a thorough stock taking of the natural resources of the province has been carried out, and a comprehensive plan formed for realizing upon them to the best advantage. The new aerial service will be employed to make a survey of the wooded limits in order to estimate the amount of timber still available and to decide what measure of reforestation is necessary. During the past year the province spent a million dollars to fight fires, but of this sum only $86,000 was devoted to aircraft patrol, the remainder being on land patrol.

Preserving Timber Wealth

Other measures to retain the timber wealth of the province, in order to give employment to as many people at home as possible, is evidenced in the recently passed legislation to license all paper, pulp and saw mills, and placing an embargo on the export of hardwood logs from Crown lands, stipulating that these must be first converted into lumber before the product can be sent out of the province. Some twenty-five years ago there was a similar prohibition placed upon the export of pine logs, and the result was that many Michigan and Wisconsin saw mill men, who had previously cut the logs and conveyed them across the border, established mills at many points in northern Ontario which give employment to numerous hands.

One of the features of the past few weeks was the sittings of the Royal Commission on Pulpwood held at various points in Ontario. With the exception of the representatives of the pulp and paper companies operating in the province, the preponderance of evidence was against any such restriction. Farmers were strongly opposed to any embargo, and so were settlers and pulpwood contractors. They contended that, if the American purchases were shut off they would be left at the mercy of the domestic demand, and prices would drop. From the Thunder Bay district alone more than 300 000 cords of pulpwood are cut annually and find an outlet across the border. There is practically no local call for poplar wood, and this is sold in large quantities over the line. The cut during the past season has been heavier than usual, and many settlers in northern Ontario depend on the sale of their wood in clearing the land to finance them throughout the year. The farmers of the province, at a convention in Toronto, passed a resolution asking the Ontario government to work out some scheme of financing the clearing of land in northern Ontario under the Agricultural Department Board, and the yeomen also went on record as opposed to an embargo or export duty on pulpwood.

So far as the pulpwood supply for the future is concerned, many companies are adopting selective cutting and reforestation to go hand in hand with production. It is the object of all large concerns to ensure a future supply of wood, and more thought and effort are being directed along this line than ever. The question is often asked, how long will the present pulpwood supply in Ontario and the other provinces last? Discarding the figures of saw logs, it is believed that Canada has approximately 1,300,000,000 cords of pulpwood, of which a little less than half is located in the eastern provinces. Ontario has about 300,000,000 cords. The hope of the future lies in an awakened public interest and in proper and efficient protection from forest fires so as to ensure supplies for the future near manufacturing centres.

Is Production Going Too Fast?

Among the biggest problem confronting the pulp and paper industry today and being considered by men of foresight and vision is whether production is not going ahead too fast, and this applies more particularly to the news print phase. How long will the mills be assured of ample raw material? The latter aspect is arousing keen interest, and companies are not only conducting their own reforestation but are buying more freely each succeeding year from settlers and farmers in order to conserve the wood on their own limits.

As already stated, there is now manufactured in Canada about 5,200 tons of news print daily and about the same quantity of ground wood pulp and 3,000 tons of chemical pulp. The grades of paper and pulp exported to the United States during the past two years were as follows:

	1922 Tons	1923 Tons
News print	887,835	1,115,355
Groundwood	184,457	216,957
Sulphite unbleached	134,476	167,182
Sulphite bleached	143,035	147,594
Sulphate	148,336	146,349
Pulpwood (cords)	1,011,332	1,384,230

Canada's output of news print has almost equaled that of the United States, and has almost doubled since 1917, while, in the same period, United States production increased only a little over 14 per cent. Last year the latter country took no less than 88 per cent of the entire news print of the Dominion.

Reverting to the oft asked query if development in the news print line is not going ahead too fast in the Dominion, one fact is significant, and that is, no Canadian company exclusively producing news print has failed to meet its bond interest during the last eight years, while, on the other hand, four pulp companies are in liquidation but are carrying on, while three or four others are closed down and two more are undergoing reorganization. Yet the paper trade is not discouraged, and scarcely a month goes by without the formation of some new organization. When financial conditions improve and the question of whether an embargo will be placed on pulpwood cut from private lands is settled definitely (as, it is expected, it will be when the report of the Royal Commission comes down), there will be a clearer route ahead.

The late Sir John Macdonald, Premier of Canada, when speaking of the western province of Manitoba, said that nothing could check that prairie area, and it will not be many years before news print and other mills will flourish in the west. Then, instead of the pulp and paper industry being confined to the provinces of Ontario, Quebec, New Brunswick and Nova Scotia in the east and British Columbia in the west, Alberta and Manitoba will also be participants in the great industry, which is doing more to place the Dominion on the map than any other enterprise. There is no reason for apprehension, and the failure or suspension of a few concerns making lines of paper other than news print will not halt the procession of progress and expansion.

George Carruthers, of Toronto, president of the Canadian Pulp and Paper Association, touching upon the question of pulpwood supplies in a recent address, told pulp and paper men that they were using up Canadian forest faster than the forests could produce trees, and that unless efficient cooperation for conservation and fire protection was followed there would be uncertainty so far as future requirements are concerned. Mr. Carruthers has long contended that the destruction of thousands of young growth for Christmas trees was an appalling loss, and their export should be prohibited.

During the past year there were several extensions to plants, and others are in progress or contemplation. The ground wood plant of the Provincial Paper Mills at Port Arthur will be increased in capacity from twenty to forty tons.

The Year's Expansion

The Central Paper Company of Muskegon, Mich., took out an extra provincial license to expend in operations in Ontario a sum up to one million dollars. The company has extensive timber limits in northwestern Ontario.

The Lennox Paper Mills of Camden East, Ontario, were purchased by O. A. Porritt, of Montreal, resumed operation and are turning out book and writing papers.

A charter was granted to the Niagara Paper Mills, Limited, with head office in Toronto, who intend erecting a new specialty mill at Merritton. It is expected that work will start this year.

The Great Lakes Paper Company has about completed a new ground wood pulp mill of 180 tons capacity at Fort William, Ont., and will, during the coming season, proceed with the erection of a

mill which will turn out 100 tons daily of print paper. The entire outlay will be about $3,000,000. The company has agreed to employ not less than 600 hands for 250 working days in each year.

The International Fibreboard Company's plant at Penetanguishene, Ont., was burned down in August last, and new premises were secured in Midland, and the company has again started operations in that town on a large scale. The firm turns out wood fiber and solid wallboard, which has enjoyed a wide sale.

Gummed Papers, Limited, Brampton, Ont., are erecting an addition to their plant and have carried out several improvements in equipment.

Howard Smith Paper Mills, at Cornwall, erected an addition to their machine room, and put up a new machine shop, 120 x 50 feet. A new finishing room was also added, being built of concrete and brick. It is three stories high, 133 x 186 feet, and provides for taking in cars to the shipping room, the railway siding going right into the interior. The company also completed their wood plant at Gaspe, Que., and will handle about 25,000 cords of wood there this season.

The Cornwall Pulp and Paper Company, Cornwall, Ont., made several improvements to its plant, and is now conducted under the name of Glengarry Pulp and Paper Company. W. W. Thomson, of Toronto, is the head of the company, and C. J. Shepherd is manager. The output was considerably increased during the past season and several improvements made.

The Canadian Paper Board Company, Limited, who have plants in Montreal and in Frankford and Campbellford, Ont., will complete the company's power development at Frankford and increase the warehouse capacity.

The Continental Wood Products Company of Elsas, Ont., will erect a new kraft pulp mill of 100 tons capacity and later a kraft paper mill of 75 tons output. The company was some time ago awarded cutting rights on about 1,000 square miles of territory in the vicinity of Elsas, Kapuskasing district.

The Strathcona Paper Company, Limited, of Strathcona, Ont., made several improvements during 1923 to their beating and boiler room which increased their output of boxboard, building and wrapping papers.

The Spruce Falls Company began operations at Kapuskasing, Ont., turning out easy bleaching sulphite. The production is 120 tons a day, and the plan is equipped with four digesters. Over fifty houses were put up for employees and a large community clubhouse erected.

The Thunder Bay Paper Company, Port Arthur, Ont., installed new equipment and doubled the ground wood pulp capacity of the plant, bringing it up to 60 tons a day. The company is building a new dock of 252 feet frontage and 500 feet of trestle work.

G. E. Farlinger, of Sioux Lookout, Ont., will erect a large pulp mill at that place and is at present developing water power on the English River.

Kilgour Brothers, of Toronto, erected a new paper bag factory at Windsor Mills, Que., and removed this department of their business from Toronto to that place.

The Dominion Tar and Paper Company will erect a plant costing $200,000 on land leased from the Toronto Harbor Board, and will turn out tar and paper specialties.

The Provincial Paper Mills, Toronto, will install a second book machine in their plant at Port Arthur, and double the capacity of the mill, which was built and opened a year ago.

The Backus-Brooks Company, Kenora, Ont., put in operation an 80-ton ground wood mill, which has been running successfully for nearly a year. The new news print mill of 100 tons has also been completed, and it is expected that each year there will be new units added until the plant reaches the maximum production of 1,000 tons a day. This will then be the largest paper mill of its kind in the world.

Bradshaws, Limited, erected a new factory for making waxed paper products on Symington avenue, Toronto. The structure is of brick and steel, two stories high, and in dimensions is 216 x 65 feet. The most modern machines for waxing have been installed and each is driven by an individual motor.

All the digesters of the Mattagami Pulp and Paper Company at Smooth Rock Falls were relined and production increased to 165 tons daily of easy bleaching sulphite pulp.

The Porcupine Pulp and Lumber Company, Hoyle, Ont., have trebled the amount of pulpwood which they have taken out and will ross the supply for the Cliff Paper Company at Niagara Falls, Ont., and also build a saw mill this season and several more workmen's cottages at Hoyle.

NEW 232 INCH WALMSLEY FOURDRINIER OF THE BELGO-CANADIAN PAPER CO., AT SHAWINIGAN FALLS, QUE.

Water Treating Plant at New K. V. P. Mill

New Filteration Plant at Kalamazoo Is By Far the Largest, Most Complete and Most Successful Plant in the Country Treating Water for Industrial Use—Up to Date It Has Delivered a Perfect Water for Paper Making at a Rate of 9,360,000 Gallons of Water a Day—Maximum Chemical Is $11.50 Per Million Gallons Under Worst Conditions.

Written Especially for the Annual Number of the Paper Trade Journal, by Howard P. Hall

Delivering a perfect water for paper making at the rate of 9,360,000 gallons a day is the accomplishment achieved by the new filtration plant installed for the Kalamazoo Vegetable Parchment Company of Kalamazoo, Mich., by the Power Plant Specialty Company, of Chicago.

The plant, which includes the intake pump house and filter house and feed lines occupies a triangular piece of ground 60 feet wide at the narrow end, 145 feet wide at the other end and 600 feet long. The filter house has a ground area of approximately 12,000 square feet. Of this space the primary filters, 16 in number, have an area of 3,440 square feet. The balance of this structure is devoted to chemical mixing processes. According to F. F. Vater, president of the Power Plant Specialty Company, this is the largest, most complete and most successful plant in the country treating water for industrial purposes.

Water is taken direct from the Kalamazoo river, but two miles below the mouths of the city sewers and the dumpage of every other mill in the city and transformed from a veritable quagmire of nauseous filth and by the treatment turned to the manufacture of paper clear, free from odor, free from algal spores, while tested samples have been negative for pathogenic bacteria, in every way a water ideally adapted for the making of high grade papers. Minimum in chemical cost and a corresponding low cost in labor are provisions in evidence in the construction of this unit of the great industry.

Conditions confronted in securing an adequate water supply for the new Parchment mill and how these were overcome are related by F. F. Vater in an interview with a representative of the PAPER TRADE JOURNAL, as follows:

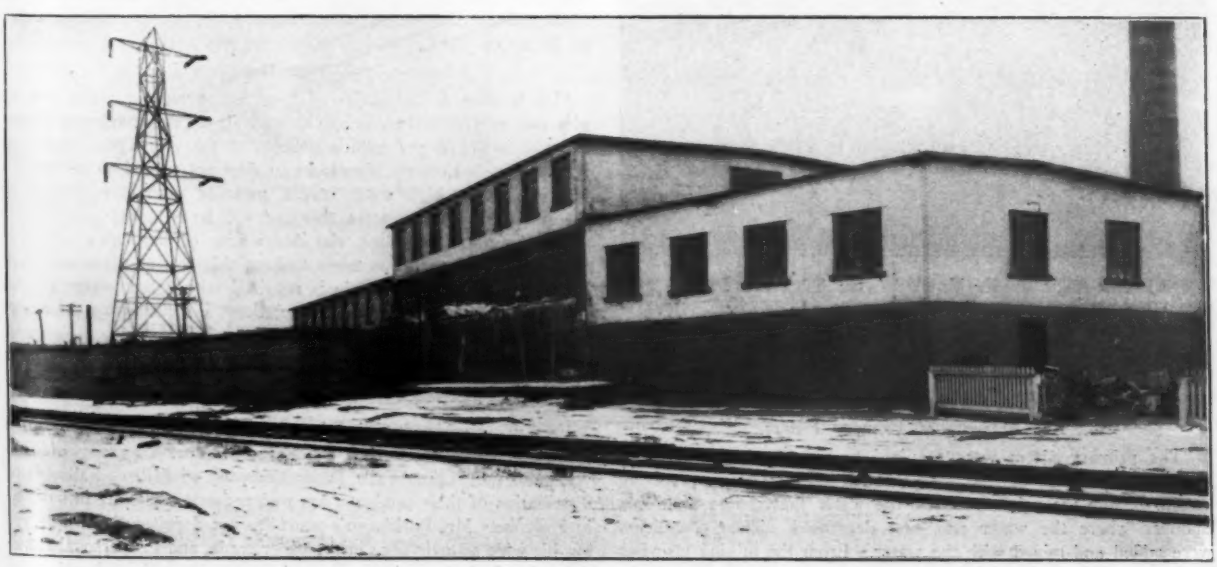
Question of Water Supply

When the building of the new mill of the Kalamazoo Vegetable Parchment Company was decided upon, the question of water supply became very important. Ground (well) water could not be had. The water bearing strata from which they obtained their supply, would not furnish enough water to keep them running comfortably. The requirement for the new mill was double that supplied to the present mills. Wells, therefore, were out of the question.

"Since the treating plant was placed in service, the well supply for the other mills has been augmented by taking 1,500 gallons per minute from the treating plant. About a mile and a half down Kalamazoo river from the new mill, Spring brook flowed into the river. Spring brook would not supply more than 5,000,000 gallons daily. It was clear when the weather was dry, but after a rain it was very yellow and would require treatment. The cost of obtaining this insufficient supply without including the cost of a treating p.ant, would amount to about $150,000.00.

Sewers Present Serious Problem

"The Kalamazoo River would supply all the water needed, but the mill location was down stream and below (about 2 miles) the mouth of the city sewers. All of the sewage from the city flowed



NEW WATER TREATING PLANT OF KALAMAZOO VEGETABLE PARCHMENT CO., KALAMAZOO, MICH.

into the river without treatment. In addition there were 18 other paper mills up stream dumping their wastes into the river. In times of low water and hot weather, it was a filthy, foul smelling stream, seemingly unfit for use. Gas bubbles would form at the bottom of the stream, rise to the surface and break, releasing a foul smelling scum. As a last resort an effort was made to see what could be done toward using the river water. It was found that it could be treated. That, treated, it was clear, free from odor, free from algal spores, and a tested sample showed negative for pathogenic bacteria.

Chemical Cost Not Prohibitive

The chemical cost was not found to be prohibitive, and a contract was entered into for the necessary equipment. Other mills on the river had intakes to the river which were troublesome. Slush, ice, grass, leaves, and sticks would enter the intake and stop the flow of water. A new intake was designed through which the flow of water was slower than the current of the river at low stage.

Pump Divided Into Two Sections

"The intake pipes conducted the water into the pump pit by gravity. The pump it was divided into two sections by sliding screens in relay that could be raised and cleaned. The service pump was placed in the second section of the pump pit and was protected by the sliding screen. This pump delivered the water through 24 in. cast iron pipe to the treating plant, at an elevation of about 50 feet. At the treating plant, the water flowed through an automatic control valve into revolving screens, clothed with brass wire screens 100 meshes to the inch. The sewage, and paper stock removed by the screens, was piped back to the river. From the screens, the water flowed into a weir box containing two main and two adjustable split off weirs. The split off water, was used to

FILTER BEDS OF K. V. P. WATER TREATING PLANT

proportion the feed of chemical and was then pumped back into the main supply. The main weirs passed the water into concrete troughs conducting it to the primary filters, 16 in number having a total filter bed area of 3,440 square feet.

Requirements of Primary Filters

"The primary filters were required to remove the paper stock and sewage fine enough to pass through the 100 mesh revolving screen. From the primary filters, the water flowed into a mixing chamber where the water was first degreased. Then coagulents were added and mixed with the water. From the mixing chamber the water flowed through a channel into a sedimentation basin where time was given for complete chemical reaction, and sedimentation. From this basin the water flowed through concrete troughs to the finishing filters, which removed all sediment and from the finishing filters into a clear well.

"The elevation of the plant was such that the water would gravitate from the clear well to the reservoirs at the mills. A recording meter was placed at the weir box showing the quantity of water treated in gallons, per minute. The split off water which is an exact percentage of the total water treated, is used to proportion

WATER SCREENS OF K. V. P. WATER TREATING PLANT

the feed of the chemical automatically as changes occur in the quantity of water required.

Chemical Feeding Equipment

"The chemical feeding equipment is in duplicate insuring a constant supply of chemicals, irrespective of needed repairs. The blowers supplying the air for back washing the filters, as well as the back wash water pumps, are also in duplicate. The plant is all above ground, is on a triangular piece of land 60 feet wide at the narrow end, 145 feet wide at the other end, and 600 feet long. The basin walls are 15½ feet high. The treating plant was designed to purify 7,000 gallons of water a minute equal to 10 million gallons a day of 24 hours.

Largest and Most Complete Plant

"Up to date, it has delivered a perfect water for paper making at a rate of 9,360,000 gallons of water a day. The maximum chemical cost is $11.50 per million gallons, at the worst ever condition. At the present time the chemical cost does not exceed $8 per million gallons, and in high water stages, meaning a greater dilution of the sewage and mill wastes, this cost will be reduced.

"In designing the plant, the desirability of low labor cost was recognized, and care was taken to keep this cost at a minimum—24 hours time of one man, only is required with 8 hours time of one consumed in mixing the chemical solutions, and caring for the coarse screens in the pump pit.

"It is by far the largest, most complete, and most successful plant in the country, treating water for industrial use."

Fred T. Burkhardt, who for the past twenty years has been prominently connected with the Parsons Paper Company of Holyoke and the Millers Falls Paper Company of Millers Falls in the distribution of their products, has resigned and will start in business in Holyoke. Mr. Burkhardt's plans are not definitely known as yet, but his wide acquaintance in the paper trade, and his personal standing with both manufacturers and merchants alike, should ssure success in any undertaking.

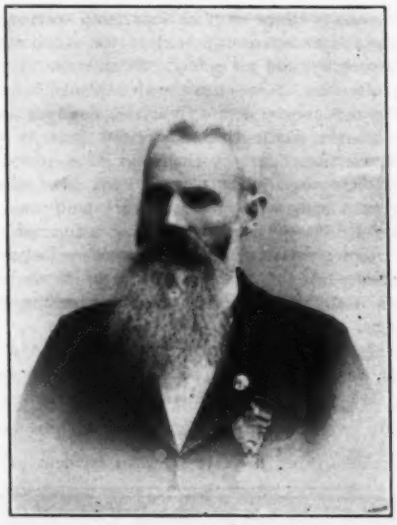
Trained Many Young Men in Paper Making

Among the most notable figures in the paper industry who died during the past year was Peter Olof Swanson, whose death occurred at Gransholm, Sweden, on December 20, 1923. He was 74 years of age and had, for so many years, been identified with the industry that his skill and personal characteristics had exerted a wide influence in the industry, not only in the land of his birth but far from the boundaries of Sweden.

A recent number of "The Svensk Pappers-Tidning" (The Swedish Paper Trade Journal) reviewed at considerable extent his life and work, according to him the distinction of being "One of the most distinguished men in the history of the Swedish paper industry during the last fifty years."

A Lover of Young Men

His achievements were many but, perhaps, the greatest of them was his influence with young men. He was always a lover of young men and possessed a rare understanding of them. He took a great pride in helping them and in watching them develop under his direction. He had the faculty of saying just the right word at the right time, of giving the right encouragement when it was most needed and of speaking the right praise when it was merited. These qualities enabled him to win the respect and affection of the young men with whom he was brought in contact and, unknowingly



PETER OLOF SWANSON

he was building for himself a monument more pretentious than any human hands could erect over his last resting place.

Many Pupils Prominent in Paper Industry

Today many of these men are prominent figures in the paper industry throughout the world. Many of them are holding responsible positions in the industry in the United States where, embued with the enthusiasm and high ideals which never failed Mr. Swanson, they are today handing down his teachings to other young men who look to them for instruction.

Was Highly Skilled

For half a century Mr. Swanson had been identified with the industry. During most of that time he held the position of Superintendent in paper mills in Sweden. His skill as a paper maker was of the highest quality.

It was during the reign of King Oscar 11 that he was signally honored when he received the highest token in the form of a gold medal for excellence of service in the trade. That was in 1904.

In the memoirs of "Molae Chartariae Suecane" mention is made

O. FREDERICK SWANSON

of the fact that in the jubilee edition commemorating the twenty-fifth anniversary of the Paper Mills Association, a picture and sketch of Mr. Swanson found its place among the data regarding the notables connected with the Swedish Paper Industry.

Always a hard worker and a lover of his work, Mr. Swanson still realized the value of recreation and found time, at rare intervals, to engage in healthful forms of sport. Outdoor life appealed to him and he was endowed with a great love of Nature. Hunting and fishing were favorite recreations with him and in his younger days he was also fond of skating and skiing.

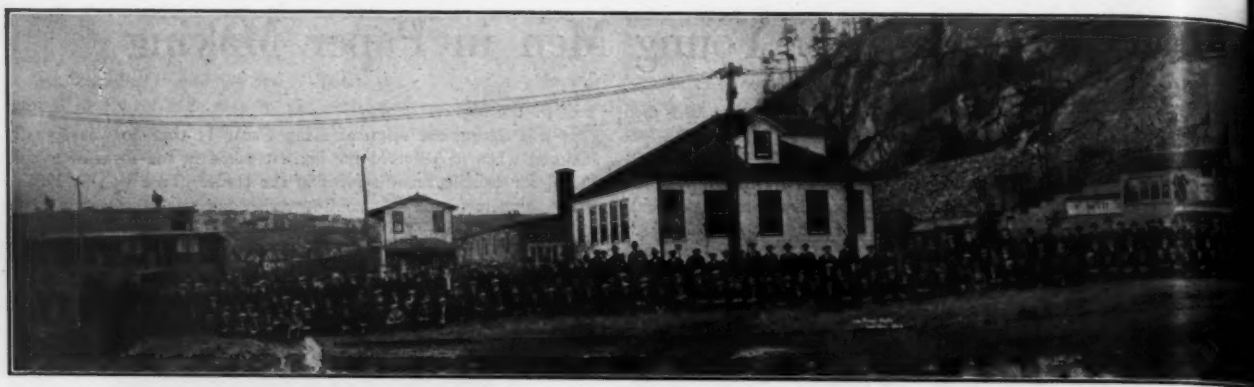
Never Visited America

It is strange that, although the exportation of Swedish paper and pulp is large to this country and that, although many of his disciples came here to take up their work in the industry, Mr. Swanson, himself, never visited America. At the time of his death he was connected with the Gransholms Paper Mills at Gemla, Sweden. His passing occasioned great grief in the industry and a large number of the notables of the industry united with the great number who had known Mr. Swanson only as a man, in paying a last tribute to his memory.

Two Sons Connected with Paper Industry

Two of the sons of Mr. Swanson are connected with the paper industry in this country. O. Frederick Swanson has been identified with the paper and pulp business in the United States since he was a young man. He is today Manager of Sales of J. Anderson & Co., and The Pulp & Paper Trading Company, 21 East 40th street, New York city. He enjoys a wide acquaintance and many friends in the trade.

Another son is Carl William Swanson who is night superintendent of the Bryant Paper Mills at Kalamazoo, Mich.



THE SAFEST PAPER MILL CREW IN THE WORLD

An official of the Kimberly-Clark Company recently received a letter from a former employee, containing this paragraph:

"If there is such a thing as a safety complex, the Kimberly-Clark organization—and especially the Niagara Mill—sure has a severe case of it. I am as proud of the record Niagara has made as if I were still in the organization."

The above comment fairly reflects the spirit of safety which has taken possession of Kimberly-Clark under the direction of M. G. Hoyman, safety director.

The Niagara plan, employing six hundred and fifty-three men, with an accident record only a few years ago of twelve to fifteen per month, finished 1923 with but five accidents causing loss of time. To cap the climax, they made a straight run of 150 days (97,500 man-days) with no accidents whatever.

The management and men of the Niagara plant, in view of this record and being unable to discover a groundwood, sulphite and paper unit of like size with a safety record touching theirs, lay claim to "The Safest Paper Mill Crew in the World."

Safety Challenge Cup

About a year ago, a Safety Challenge Cup was put up by the management of the company for competition between the three major plants, namely, Kimberly, Niagara Falls and Niagara, Wis. Niagara won the first sixty-day heat with a clean slate, then repeated the performance over a second sixty-day stretch. Niagara Falls, coming from behind, captured the third heat and followed in with a second win during the fourth sixty-day period. Permanent possession of the cup was to come with the third leg on the cup, and this Niagara, Wis., secured on the night of November 30, 1923, with a third sixty-day stretch free from any lost time injury. In recognition of this achievement, the accompanying photographs were made, and on December 9 a Safety Jubilee was held with a mass meeting in the auditorium of the Community House, addressed by F. J. Sensenbrenner, first vice-president of the company, who made formal presentation of the challenge cup to the men of the Niagara plant.

Intelligent, Enthusiastic Safety Leadership

Results such as these require leadership—earnest, enthusiastic leaedership. Every department head of the Kimberly-Clark Company is thoroughly sold on safety. In addition to this, the foremen's organizations of the three major plants have majored on safety. The reason why Kimberly-Clark Company inter-mill contests have brought such outstanding results finds its answer in the sporting element introduced by challenges of one group of foremen to another. Too often safety contests have been superimposed by the management and, when so started, are uniformly disappointing in their results. On the other hand, when a foremen's organization of its own volition issues a challenge to another foremen's organization, the matter takes on a different aspect. Pride in accomplishment asserts itself. The urge then comes from the inside out and safety becomes a vital issue.

In the olden days, a dozen accidents might occur in a month and nothing was thought of it. Today a lost time accident in the Kimberly-Clark Company causes as much commotion as a fire.

Proper Records Help

Right psychology has more to do with accident prevention than

MEMBERS OF THE NIAGARA FOREMEN'S CLUB

guarded machinery. In the Kimberly-Clark Company, safety records rather than accident records are featured. The weekly chart magnifies, in terms of each foreman, the number of actual days his crew has run without injury, the total consecutive safe man-days to date, and his best previous record in safe man-days. At the top of each weekly plant safety sheet is the total days the whole plant has gone without accident.

Every red-blooded foreman takes pride in seeing his safety total accumulate and by the same token has no desire to be the foreman responsible for bringing the total consecutive safe days for the plant back to zero.

By-Products of Safety

For years, the Kimberly-Clark Company has carried its own accident liability. The first result of its successful safety campaigning has been a substantial saving on this account.

Still more important, however, is the team work and morale which develops through an organization of six hundred and fifty men which can run, say, 150 straight days without injury of any kind. Men take pride in their work, give more allegiance to their leadership, and the reflection through the whole community life is beneficial. At Niagara, the entire community caught the safety spirit and, during the year 1923, there were fewer accidents of all kinds through the village than occurred in the mill. The two doctors would starve to death if they were dependent upon mill or community accidents for their livelihood.

CHANGES IN K. V. P. CO.

Two important changes are announced in the official family of the Kalamazoo Vegetable Parchment Company. Jacob Kindleberger, for years president and general manager of the company, retains the presidency but has resigned general managerial responsibilities to R. H. Hayward, who took his position April 1. At the same time Charles McClellan, for three years with the concern becomes superintendent of papermakers, placed in charge of both mills and succeeding Frank Monehan, resigned.

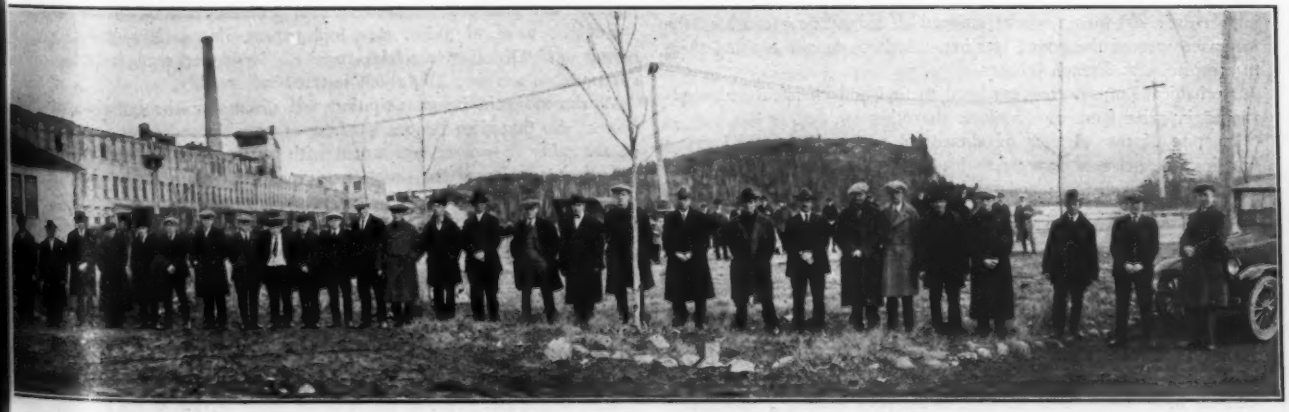
Mr. Hayward is a life long papermaker, having worked in numerous eastern mills and then became connected with Wolfe & Co., New York, engineers and experts. He knows the game both practically and technically. About a year ago he was engaged by the University of Michigan to teach practical papermaking. He came to Kalamazoo in connection with his duties and was retained in an advisory capacity by the Kalamazoo Vegetable Parchment Company. So well has he done the work assigned him that he has been retained as a permanent member of the organization.

Mr. Monehan came to Kalamazoo from Watertown, N. Y., as superintendent of the new Kalamazoo Vegetable Parchment mill. He remained here about six months. Mr. McClellan has handled the mill for the past two weeks, getting very satisfactory results out of the giant, fast running paper machine.

GOES WITH AM. ENGINEERING CO.

Edward B. Cowles, for a long number of years an officer of the Pejepscot Paper Company with paper and pulp mills at Brunswick and Lisbon Falls, Me., has joined the American Engineering Company of Philadelphia and will specialize in the application of the Taylor stoker to pulp and paper mills. Mr. Cowles' father and grandfather also were for many years prominently connected with the American paper industry, both having been former presidents of the American Paper and Pulp Association some years ago.

Being a practical paper maker and having a large acquaintance among the paper men of the country, Mr. Cowles is by training and antecedents well qualified to fill all the duties of his new position.



Club Where Team Work Put It Across

Critical Year for French Paper Industry

Past Year Was One Marked by Unusual Conditions and Ended in Midst of the Greatest Uncertainty—Coal Supply Problems, Labor Difficulties and Fluctuation in Currency Were Some of the Things Which Caused Every Paper Mill in France to Sustain Enormous Losses—Unexpected Rise of Franc Caused Interruption in Exports and Forced Several Countries to Cancel Orders Previously Placed.

Written Especially for the Annual Number of The Paper Trade Journal

The beginning of the year 1923 was not very encouraging for paper manufacturers and converters in France.

The failure of the Conference of Paris had an unfortunate effect on industry in general and on the paper industry in particular.

Factories that had postponed buying chemical and mechanical pulps were obliged to purchase under very unfavorable conditions.

While in America and other favored regions, newspapers doubtless had to refuse matter for lack of paper, in France a certain number of technical publications had to reduce the number of their pages, for lack of advertisements.

From the end of the year 1922, orders became fewer and fewer, and certain mills, in order to get work, did not hesitate to sell below the rates of the French market.

Cigarette Paper Mills Active

Cigarette paper mills alone show a certain activity and are again beginning to export. But in any case they have to meet the keenest competition on the part of Italian paper manufacturers who are fighting for the markets of Europe and Asia.

On the other hand, the French colonies are placing orders for papers of all kinds, particularly wrapping paper.

During the month of February, we find paper manufacturers somewhat encouraged on account of the occupation of the Ruhr, which stopped the importation of German news print. But as the stocks of the important periodicals were very large, real improvement in sales can only be expected in a few months.

Rags of all kinds advanced by leaps and bounds, and continued to do so during the entire year.

Dark cottons, jute, ropes advanced 10 to 15 per cent in a few days.

Old papers also went up and the jobbers who had fairly important stocks sold all they had available in a few days.

Dealers in old English papers, who used to ship into France quantities of merchandise (one of their representatives alone used to import over 700 tons a week) stopped all shipments because of the increased rate of the pound sterling, which no longer enabled them to compete with French jobbers.

Mechanical pulps were very hard to find and chemical pulps advanced in price from one week to the other.

In spite of the advance of almost all raw materials and paper supplies, the price of paper remained stationary, and this gave the impression of a disorganized market and lack of real control.

Strike of Miners Had Effect

The strike of the Sarre miners deprived us of a million tons of coal per month and brought about an alarming advance. The same coal that could be bought less than a month ago at 90 frs. a ton, now soared to 120 frs. and was extremely scarce at that, the mines having given their representatives strict orders not to take heavy orders and not to solicit the trade.

Some mills whose coal supplies were very limited found themselves in a very embarrassing position.

At the beginning of March, papers of all sorts were selling at better prices than previously, and the mills advanced their prices about Frs. 5 per 100 kilos.

Several firms in the provinces who only used to buy abroad placed orders with French mills.

In general, paper manufacturers had work for several weeks, but the stocks that accumulated during the dull period did not go very quickly, as buyers limited their purchases to what was strictly necessary.

Coal, old papers, rags and other paper supplies continued to advance in price, and the rates given out by the Syndicate Chambers were no longer even applied: if a certain article was required, the sellers asked whatever they wanted for it and often got it. More than ever, the market was governed exclusively by the law of supply and demand.

Many Orders Cancelled

Italian and Belgian papers came into the country; the sale of rags abroad, especially in America, began to worry paper manufacturers. Manila rope, which as recently as the month before, was offered at famine prices, now became exceedingly scarce. Chemical and mechanical pulps were almost prohibitive. The unexpected rise of the franc brought about an interruption in exports and several countries with a depreciated exchange cancelled the orders they had placed at the beginning of the month.

On account of strikes and lock-outs, French paper mills were unable to take advantage of the rise of our money by purchasing in Scandinavia. In any case, the month of March came to an end showing firmness in paper quotations and a more encouraging outlook.

During April, in spite of the Easter holidays, the paper mills took orders and some of those that turn out special kinds were even obliged to turn orders down.

Converters and printers who, after Easter, nearly always complain of dull business, did not find this to be the case this year.

But the price of pulps, rags, old papers, linens, felts, coloring matter and all other material required for paper manufacturing, continued to advance, slightly it is true, but steadily.

Workmen again began agitating and discussing the question of wages. So that if on the one hand paper mills showed great activity, on the other they were confronted with numerous difficulties which caused the profits of the situation to vanish almost entirely.

The relative improvement of exchange in northern countries made it possible for exports to become more active, and new firms established themselves in our capital for the sale of kraft paper.

Prices Showed Weakening Tendency

At the beginning of May, the news that reached us from the various French paper districts showed that the market was quiet, and prices, in spite of the high rates paid for raw material and feeding of the machines, had a slight tendency to weaken.

Mills in the Isère region, which is the paper section of the country par excellence, were the first to show a slowing down of orders, and

their salesmen did all they could to take orders, even of small importance.

Mills in the Paris district suffered less from the lack of orders than other sections and the present slow sales have not affected them yet.

Old papers, the price of which had been constantly going up for months, were quieter.

Rags were quieter, too, and English and American purchases came to a full stop.

Foreign countries sent fairly important lots of paper of all kinds, Sweden and Norway being at the head of the list.

The demand for certain sorts grew very small and manufacturers began to think about modifying the nature of the output.

Important shipments of Belgian paper were made.

In June, the aspect of the market began to change slightly.

Labor Relations Strained

In the first place, the strained situation between employers and workmen in Scandinavian countries gave legitimate cause for anxiety to our paper manufacturers, who feared they might be compelled to pay ruinous prices for their pulp requirements; on the other hand, the franc started going down again, slackening the import of paper.

Wrapping paper mills showed a certain activity.

Old papers and rags weakened considerably, making it possible for the mills to obtain their supplies at a better price than recently.

The paper manufacturers, however, were somewhat hesitant, in the hope of seeing prices go lower still. There was no buying, but little manufacturing and no effort was made to find other outlets, either at home or abroad. In the meantime, the importers took advantage of the situation and of our inertia to import as much paper as possible.

The question of the Ruhr was still unsettled, with the possibility of remaining unsettled for a long time, and this weighed heavily on our industry and commerce.

One very important fact to be pointed out: towards the end of the month, Germany, who had given no sign of life ever since February, resumed her paper shipments.

Cardboard exports to our colonies began to pick up. By the beginning of July, with the going down of the franc, chemical pulps had advanced at least 10 per cent.

In spite of themselves, paper manufacturers were obliged to make their customers stand the difference, and met with great resistance.

This state of affairs gave rise to all kinds of difficulties with the trade, and several mill owners began to consider the advisability of disposing of their enterprises.

Coal Supply Becomes Problem

The question of coal supply, in spite of the optimistic reports of the Government, became a real problem, and there was nothing to indicate where difficulties would stop.

Several manufacturers wondered whether it would not be better to shut down, at least for the time being.

Regarding raw material, the situation was a somewhat confused one. There was fear of an advance in the price of old papers, especially the better grades, because of the high rate of exchange on the pound sterling, which put a complete stop to the exporting of old English papers to France.

Towards the end of the month, the market was very weak—as it always is at this time of the year on account of the vacation period.

In spite of the dullness, the price of almost every kind of paper went up slightly.

August began in a fairly satisfactory way for this industry and the paper and cardboard business.

The price of pulps remained stationary, but supplies proved costly on account of the uinterrupted drop of French money.

Paper imports were enormous during the first half of the year. Upon examination of customs statistics, it is seen that papers for the press and publishing business, for the first five months of the year, reached the impressive figure of 53,000 tons.

Customers energetically fought the advance which the manufacturers justly insisted on.

Rags Continue to Go Up

Rags continued their ascending march. There were some who advocated an embargo on exports. This measure would have been a dangerous makeshift, that would have handicapped the jobbers and the great activity shown by them; as a result, merchandise would not only have become scarcer, but our trade balance would have shown a considerable deficit.

The paper market in September showed a marked improvement for certain kinds and for certain sections of the country.

Thus, paper mills in Seine-Inférieure, for instance, were refusing orders, while others had only a limited amount of work.

The uncertainty of the times and the passive resistance of the workmen in the Ruhr were obstacles to the satisfactory development of commerce.

Raw material continued to advance, especially rags, which were more and more diverted into the export trade. Some kinds, such as phormium, could scarcely be found, because America was absorbing all that we had available. Heavy hemp rope, for the manufacture of cigarette paper, was also getting scarce, and prices soared to a peak never reached before. On the other hand, for chemical pulps, a drop occurred in export countries, which will become more and more marked, as will be seen further on. But French paper factories were unable to take advantage of this because the franc was daily losing a little more of its value.

Mills were handicapped, too, by a shortage of skilled labor.

In spite of the enormous influx of foreign workers (approximately 15,000 a month) it was almost impossible to find specialists such as foremen, overseers, etc.

The most salient fact of the month of October was the sudden rise of the pound sterling, which crossed the 80 franc line.

Business in general was a little quieter than the preceding month.

Raw Materials Fluctuate

Raw material for paper mills suffered various fluctuations; chemical and mechanical pulps were continually weakening. The demand for rags in the interior of the country was very small, while exports remained active.

Paper from the port of Trieste began to come in. It was the first time since the war that the great Austrian port, now belonging to Italy, sent us paper.

The somewhat troubled political situation in its foreign aspects prevented any free action, and apprehension paralyzed those most inclined to be optimistic.

This state of affairs, moreover, was not only to be noted in France. Other countries, particularly England, were grappling with unprecedented difficulties—difficulties most erroneously attributed to French policy in the Ruhr. It would have been fairer to attribute them to Germany's insolvency and the systematic obstruction of a certain country against our sacred rights.

In November, fluctuations of exchange reacted unfavorably on the market and buyers did not know where to turn for their paper and cardboard.

Chemical pulps continued to weaken, but the advance of the crown almost completely eliminated French buyers from the Scandinavian market.

The year ended with the request that coefficient 3 be applied to paper for the press and publishing business. A great number of chambers of commerce joined their requests to those of the French paper mills, in the hope of putting an end to a ruinous condition of affairs for our paper industry. No one is ignorant of the fact that in the guise of paper for the press and publishing business, great quantities of paper on spools and in reams come into France —hence the keenest competition and an incalculable loss for our industry and commerce.

WOODPULP AND GROUNDWOOD MILLS OF EASTERN UNITED STATES AND CANADA

Shows Mill Locations, Daily Production, Capacity, Kind Of Pulp, And If Any Excess Is Available For Market

Based On Lockwood's Directory Of The Paper Trade, 1923 Edition, And Our Own Special Investigation.

NEW BRUNSWICK
NOVA SCOTIA
MAINE
VERMONT
NEW HAMPSHIRE
MASS.
CONN.
R.I.
NEW YORK
LAKE ONTARIO
PENNSYLVANIA
NEW JERSEY
DEL.
MD.
WASHINGTON
REFERENCES
State Capital
Ground Wood
Sulphite
Soda
Sulphate
Cotton Seed Hull Shavings Pulp
Excess Per Market
No Excess For Market
Basic Information Not Furnished
Numerals Indicate Daily Capacity in Tons
NEW ENGLAND PAPER & PULP TRAFFIC ASSOCIATION
C. L. WHITTEMORE, Traffic Manager.
BOSTON, JUNE 1923
Copyright, 1923 by C. L. Whittemore

Powdered Coal in the Paper Industry

In Few Industries Outside of Central Electric Steam Stations Does the Cost of Steam Form As Large a Part of the Total Cost of the Product As It Does in the Paper Industry—Pulverized Fuel Offers More to the Paper Industry Boiler Plant Than Anything That Has Been Developed in the Last Five Years—Number of Men Capable of Directing Its Application Is Limited.

Written Especially for the Annual Number of the Paper Trade Journal By A. J. T. Taylor, A. S. M. E., A. I. M. M., Pres. Combustible Engineering Corp., Ltd., Canada.

Executives and engineers in the paper industry are interested in anything that gives promise of producing cheaper steam. In few industries outside of central electric steam stations does the cost of steam form as large a part of the total cost of the product as it does in the paper industry. The steam demands on a paper mill boiler plant are usually continuous for a six-day week, with large and sudden fluctuations. The boiler plant must not only be flexible but absolutely reliable under all conditions of service. It is these considerations that make the field particularly attractive to pulverized fuel.

Summarized, the desirable conditions in a paper mill boiler room are:

1. Absolute reliability.
2. Quick response to sudden large demands for steam.
3. Ample reserve capacity so that boiler overhaul periods do not curtail paper production.
4. Lowest cost of steam by the month, all factors of cost considered.

Pulverized fuel offers more to the paper industry boiler plant than anything that has been developed during the past five years. The fundamental reason why pulverized fuel has not been more generally introduced into industrial plants is the fact that the men who are familiar with it and capable of safely introducing this method of firing coal into existing or new plants, have until recently been fully occupied taking care of the tremendous demand for pulverized fuel systems in the larger central steam stations, both on this continent and in Europe. Last year, in the United States alone, contracts were placed for pulverized fuel equipment aggregating in excess of 140,000 nominal boiler horsepower.

A relatively new art is limited in the number of men who are capable of directing its application. A few years ago there was not a single firm of consulting engineers, outside those companies actually supplying pulverized fuel-burning equipment, who had either the knowledge or the experience to design a complete pulverized fuel system. That condition is now changed in so far as central steam station consulting engineers are concerned, but even now there are only a few engineers specializing in pulp and paper mill design who have had experience with pulverized fuel. This means that the pioneer work of introducing this improved method of firing into the paper industry boiler rooms must fall largely on those firms who have been responsible for the development of the necessary equipment.

Thorough Analysis of Conditions Essential

One of the counter influences which has tended to check the general adoption of pulverized fuel for producing power and performing industrial processes, is the feeling of uncertainty on the part of the average plant owner, as to the value of such a fuel system in solving his individual problem.

He is confused by a medley of contradictory statements, and exaggerated claims, concerning a subject that needs no false coloring, but which shows to the best advantage when subjected to an impartial analysis. He is also apt to be dissuaded by some of the records of unsatisfactory results, which have occurred in certain cases, both experimental and otherwise, where ill-advised installations were made with improvised equipment, or under circumstances that violated fundamental principles of powdered coal combustion. Neither stokers nor pulverized fuel are universal in their application.

Some Notable Central Stations

Pulverized coal is neither experimental nor dangerous, and the best possible proof of this statement is the fact that within the past year the following (just to mention a few) internationally famous steam stations have placed contracts for or are operating the Lopulco system of powdered coal:

Cleveland Electric Illuminating Company, Lakeshore Station, four 3,060-hp. boilers.

Detroit Edison Company, Detroit, six 2,900-hp. boilers.

Duquesne Light Company, Colfax Station, Springdale, five 2,768-hp. boilers.

Union Electricity Company, Gennevilliers Station, Paris, four 1,950-hp. boilers.

Union Electric Light and Power Company, Cahokia Station, St. Louis, eight 1,780-hp. boilers.

Union d'Electricite, Vitry Station, Paris, four 1,655-hp. boilers.

Sentiment has played no part in the decisions made by the executives and engineers responsible for the commercial success of the enterprises just listed. The Lopulco system has not only proven its worth beyond all question but it has reached a state of stability in design so that the factor of obsolescence is not important. Operating conditions in the plants just mentioned are very similar, but even more exacting than in a paper mill. Continuous high ratings and the highest possible efficiencies are prime requisites in central station practice just as they are in paper mill practice. No amount of distorted propaganda against pulverized fuel will prevent its ultimate adoption by the paper industry. No claims of fire or explosion hazard, ash or coal dust nuisance, heavy maintenance or exorbitant first cost (as put forward by some uninformed and sometimes commercially biased writers) will prevent mill owners and their engineers from getting to the bottom of this subject and really finding out what pulverized coal has to offer from the point of view of reducing the cost of steam.

The purpose of this article is simply to direct attention to the possibilities of pulverized fuel, to give a rough outline of what a successful system consists of, and to encourage progressive thinking men in the paper industry to look carefully into the whole matter with the idea of determining whether or not it is a system of firing that should be adopted in their own plants.

Democracy of the B. T. U.

The fact that the efficiency of a properly installed pulverized fuel installation is practically independent of the grade or kind of coal burned, is of great significance when one considers that it is be-

coming more difficult each year to get a continuous supply of coal of constant quality. Further, it is usually cheaper to buy the lower grades of coal of variable quality than attempt to purchase on a rigid specification. One plant with which we are familiar had 24 different kinds of coal in its bunkers in one month. There is no stoker fired plant that could operate efficiently under those conditions. In Canada, those coals from the Maritime Provinces, high in ash and sulphur, have little value when burned on stokers, but when burned in pulverized form give excellent results.

To illustrate how independent of the grade of coal a pulverized fuel system may be, we cite one instance that occurred recently. Ten carloads of lignite were put through the Lakeside plant of the Milwaukee Electric Railway and Light Company, and although some of this coal was run through undried and contained as high as 22 per cent moisture, the boiler-room attendants were unaware that strange coal had come in except for the fact that some slight adjustment of the feeder speed was necessary to make up for the low B.t.u. value of the coal. The adoption of pulverized fuel brings us nearer to the day of democracy among the B.t.u.

Flexibility of Operation

Another factor of pre-eminent importance is flexibility in responding to sudden demands for steam. A pulverized fuel plant is as flexible as a gas-fired plant. Regulation is about the same. It is a matter of opening or closing a few valves and speeding up or slowing down some motors. Sudden swings with peaks from 300 to 400 per cent of nominal boiler rating can be handled almost instantly, and the moment the demand for steam is off, the fuel to the burners can be shut off. There are no banking or standby losses, as the radiant heat alone from the furnace walls will carry the boilers for some hours without appreciable reduction in gage pressure.

Boiler room labor costs are lower with pulverized fuel. The boiler plant, if properly designed, can be clean and free from dust. For this reason a higher grade of boiler-room attendant can be employed. There is a marked reduction in the cost of ash removal.

Some of the advantages of pulverized fuel may be summarized as follows:

1. Entire independence of the grade of coal. The cheapest coal on a B.t.u. basis regardless of the other conditions of the coal is probably the best to buy.
2. Flexibility and dependability of operation.
3. No banking loss when the steam demand is off, for no coal is burned.
4. Uniform high efficiency easily maintained under all conditions of coal or demands for steam.
5. Lower labor costs and better working conditions.

Each Plant a Separate Study

One cannot generalize about the application of powdered fuel. Every plant has its own problems, and there are cases where, due to the type or size of boilers and other factors, a careful analysis may show that powdered fuel is not justified, nor is any other large expenditure. The plant may be obsolete and a new plant required. Old boiler plants are often retained too long sometimes because there is no one in sight upon whom the responsibility for the cost and construction of a new plant can be placed. In such cases, and for new mills, an important development has just been effected in the form of a standardized steam unit (Fig. 1). These units were expressly designed to meet the requirements of the paper industry. The No. 2 unit having a normal capacity of 35,000 lb. of steam per hour, or roughly 1,000 hp., fits most ordinary conditions, and the overall cost of a boiler plant made up of these units equipped for pulverized fuel, while greater than the cost of a stoker-fired plant of equal capacity, is usually justified by the higher efficiency and greater flexibility in operation. The ground area required is less, a smaller operating staff is needed, and the cost of steam by the month is very much less than is possible with any other combination of coal-burning equipment. These standardized units can be fitted into existing plants and can be arranged in any combination for new plants. The preparation units, where the coal is dried and pulverized, are self-contained. They may be either adjacent to or at a distance from the boilers, and the only connection required between the two parts of the system is a screw conveyor to the pulverized coal bins above the steam units and ducts for taking the waste flue gases from the boiler breaching to the coal driers. These units have been designed with sufficient overload capacity so that any two will carry the normal capacity of three units for a period of eight hours.

Air Heaters Are Used

With these standardized units a new feature has been introduced in the form of an air heater in place of the economizers that are sometimes used. The average paper mill has an abundance of hot feed water returns, and it has been found more advantageous to use the waste gases from the boiler to heat air that will be introduced into the pulverized fuel furnaces than it is to utilize these gases to raise the temperature of the feed water. The percentage of saving

TABLE A

BOILER ROOM OPERATING COSTS, THE MILWAUKEE ELECTRIC RAILWAY AND LIGHT COMPANY, LAKESIDE STATION, ST. FRANCIS, WISCONSIN, YEAR 1923

Coal	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1. Tons of coal consumed	20,191	19,811	19,092	19,080	19,685	18,025	18,076	19,196	19,285
2. Per cent moisture	7.37	11.70	8.87	9.24	10.39	8.60	4.41	4.66	5.46
3. Per cent ash	11.28	12.60	11.24	11.70	8.91	9.35	11.26	11.35	11.61
4. Per cent sulphur	2.07	3.10	1.79	2.08	1.92	2.41	1.95	2.09	2.05
5. B. t. u. per lb. as received	11,950	10,888	11,516	11,422	11,528	11,718	12,521	12,305	12,194
Steam									
6. 1,000 lb. of steam generated	336,441	299,078	305,714	302,660	313,145	300,592	300,404	324,886	335,949
7. Steam pressure—lb. absolute	287	289	302	301	301	305	310	309	312
8. Superheat—deg. Fahr.	185	185	185	189	184	182	183	187	187
9. Feed water temp.—deg. Fahr.	136	135	136	137	139	141	148	156	154
Efficiency									
10. Per cent of boiler rating	197.1	189.5	183.9	187.5	194.1	193.8	193.6	221.6	203.9
11. Per cent combined efficiency of boiler, furnace, superheater and economizer overall	84.12	83.72	83.98	83.94	83.09	85.51	85.69	83.86	85.13
12. Per cent combined efficiency of boiler, furnace, superheater and economizer during steaming period	84.92	84.47	84.97	84.89	84.03	86.63	86.81	84.87	86.17
13. Per cent the banked boiler hours are of the total boiler hours on header	21.35	18.40	19.71	19.55	19.66	19.74	19.74	19.57	20.32

Cost per 1,000 lb. steam F. & A. 212° F. adjusted to a labor rate of 75c per man hour, a coal cost of 22c per million B.t.u. and a boiler rating of 175%.

14. Total operating labor	$0.023
15. Total maintenance labor	.010
16. Total maintenance material	.009
17. Total supplies and expenses	.001
18. Total lubrication	.001
19. Total fuel for steam	.244
20. Total	$0.288

NOTE: The above figures cover from the car dumper to the ash dump and include maintenance of boilers and pulverizing room buildings, fixtures and grounds.

Coal for banking is included in the fuel for steam cost.

is practically the same, but cost of installation and maintenance is less. There is no reason why air heaters should not be used to supply heat to adjoining mill buildings with a consequent reduction in the demand for live steam now used for this purpose.

The standardized units are erected complete and turned over under steam with all items of performance guaranteed. The piping layout. general arrangement units and of auxiliaries, design and construction of buildings are all done by the mill owner or his consulting engineers, but the responsibility for the vital matters of proper proportioning of boiler, furnace, air heater, coal preparation and burning equipment are centered in one place, and the various articles of equipment can, therefore, be so adjusted that a guarantee may be given stating that with coal of a certain analysis and quantity supplied to the plant, steam of a definite stated quality and quantity will be delivered at the boiler nozzle. These standardized units can be built to give a monthly overall operating efficiency as high as 86 per cent.

Cheaper Steam of Paramount Importance

Steam is the second largest item of cost entering into the manufacture of paper and is the largest item of the cost of conversion of the raw materials. Test efficiency is not what the paper mill executive or engineer is interested in. The important thing is what combination of equipment gives the cheapest steam? Records can be produced that will show the results obtained by pulverized fuel over a long operating period. We are indebted to the courtesy of John Anderson, Engineer of Power Plants for the Milwaukee Electric Railway and Light Company, for Table A, which gives in detail figures showing the complete operating cost of the Lopulco pulverized fuel equipped boilers in the Lakeside Station for the period Jan. to Sept., 1923, including all items of expense from the coal car dumper to the ash dump. It should be noted, these figures include all boiler room operating, labor, maintenance, supplies, lubrication and fuel for the steam necessary to carry out the various mechanical operations incidental to preparation and firing, so that the total covers everything except interest and fixed charges. The interest and fixed charges in the present instance are not greater than they would have been with stoker equipment.

The author has not included in this paper any reference to the matter of what is known as the "unit" system of pulverized fuel firing in which each boiler is served by its own pulverizing mill. This omission is not because he feels that the unit system is without a place in the industry, but rather because the limitations of space in this article have inclined him to devote his full attention to the "indirect" system, where the coal is prepared at a central point and distributed to the various boiler units.

Coal Preparation

The various stages through which coal passes through a preparation plant can be followed by reference to Fig. 1. The coal is first crushed just as is usually done for use on stokers, and the crushed coal, after passing over a magnetic separator to rid it of any iron particles, is delivered to the raw coal bins A. It then passes by gravity through the waste heat drier B and is dried by gases taken from the boiler breachings. The drier in some cases can be omitted. From the drier it is fed into a Raymond Impact Pulverizing mill C where it is ground to a fineness equal to 65 per cent, passing through a 200-mesh screen. The ground coal is then delivered by air to a cyclone separator D, the air separated out and the prepared powdered coal carried by a screw conveyor E to pulverized coal bins F, from which it is mechanically fed through special burners into hollow wall Lopulco furnaces and burned very much like a heavy mechanical gas.

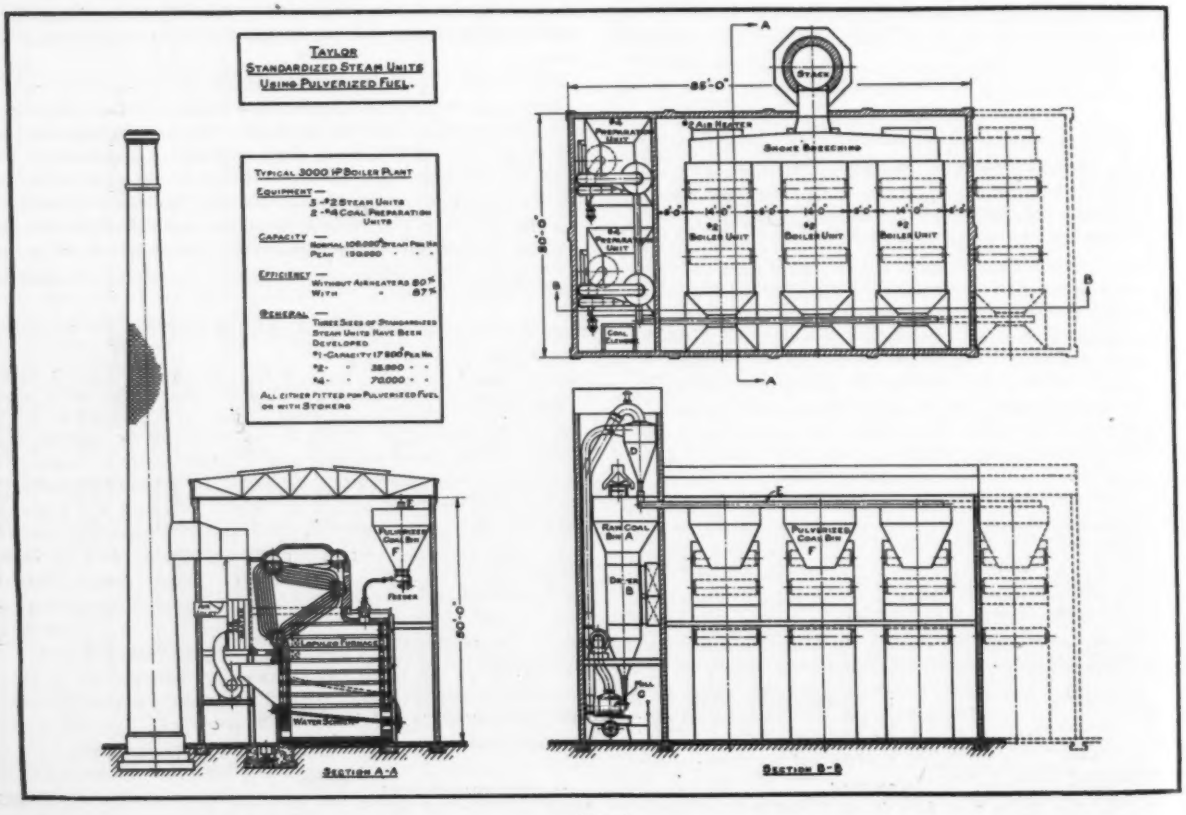

TAYLOR
STANDARDIZED STEAM UNITS
USING PULVERIZED FUEL.
TYPICAL 3000 HP BOILER PLANT
EQUIPMENT —
3 - #2 STEAM UNITS
2 - #4 COAL PREPARATION UNITS
CAPACITY —
NORMAL 100,000 STEAM PER HR.
PEAK 130,000 " " "
EFFICIENCY —
WITHOUT AIR HEATER AT 80%
WITH " " 87%
GENERAL —
THREE SIZES OF STANDARDIZED STEAM UNITS HAVE BEEN DEVELOPED
#1 - CAPACITY 17,500 PER HR.
#2 - " 35,000 " "
#4 - " 70,000 " "
ALL EITHER FITTED FOR PULVERIZED FUEL OR WITH STOKERS
SECTION A-A
SECTION B-B

FIG. 1

Essentials of a Good System

In the author's view, some of the essential features of a properly designed pulverized coal system are:

1. Gravity feed of coal from the raw coal bunkers through the driers to a mill that is capable of uniformly fine grinding.
2. Air separation of the powdered coal and an absolutely closed system of transport after the coal is ground until it is used.
3. Hollow wall steel encased furnaces of adequate volume to ensure low furnace maintenance and minimum radiation loss.
4. Water screens across the whole surface of the furnace bottom to overcome the difficulties incident to the slagging of ash having a low fusing point.

The simplicity of a pulverized fuel plant must be seen to be appreciated and the readers of this article are urged to take an early opportunity of visiting such plants as the Ford Motor Company at River Rouge, Detroit, or Walkerville, Can., the Wyandotte plant of the Pennsylvania Salt Company, the New Cahokia station of the Union Electric Company, the Lakeside plant of the Milwaukee Electric Railway and Light Company, or any of the recent representative pulverized fuel installations listed in Table B.

TABLE B

PARTIAL LIST OF REPRESENTATIVE PULVERIZED FUEL INSTALLATIONS

Name of Firm	Address	Number and Size of Boilers b.-hp.
Milwaukee E. R. & L. Company	Oneida Street Station, Milwaukee, Wis.	5— 468
Milwaukee E. R. & L. Company	Lakeside Station, Milwaukee, Wis.	8—1,308
Allegheny Steel Company	Brackenridge, Pa.	7— 333
		1— 400
Morris & Co.	Oklahoma, Okla.	5— 500
		2— 300
Ford Motor Company	River Rouge Plant, River Rouge, Mich.	4—2,647
St. Joseph Lead Company	Rivermines, Mo.	2— 768
Lima Locomotive Company	Lima, Ohio	6— 400
		1— 500
Duquesne Light Company	Brunot's Island Plant, Pittsburgh, Pa.	1— 822
West Penn. Power Company	Springdale, Pa.	1—1,532
Penn. Salt Mfg. Company	Wyandotte, Mich.	1— 822
Union Electric Light and Power Company	Cahokia Station, East St. Louis, Ill.	8—1,780
St. Joseph Lead Company	Rivermines, Mo.	2— 768
United Electric Railways Company	Providence, R. I.	3—1,260
Rochester Gas and Electric Corporation	Rochester, N. Y.	2— 875
[1]Kobe Municipality	Kobe, Japan	1— 550
Ford Motor Company	River Rouge Plant, River Rouge, Mich.	4—2,647
Firestone Tire & Rubber Company	Akron, Ohio	3— 600
Ford Motor Company of Canada, Ltd.	Ford, Ont.	3—1,350
[1]Toho Electric Company	Hakata Kiushiu, Japan	1— 800
St. Joseph Lead Company	Rivermines, Mo.	1—1,500
[1]Nippon Electric Power Company	Amagasaki Plant, Amagasaki, Japan	4—1,082
[2]Cleveland Electric Illuminating Company	Lakeshore Station, Cleveland, O.	4—3,060
[2]Milwaukee E. R. & L. Company	Lakeside Station, Milwaukee, Wis.	8—1,750
Farr Alpaca Company	Holyoke, Mass.	3—1,000
[1]St. Paul Gas Light Company	Island Station, St. Paul, Minn.	3—1,044
[1]Duquesne Light Company	Colfax Station, Springdale, Pa.	5—2,768
[1]Metropolitan Edison Company	Middletown, Pa.	3—1,471
Denver Gas and Electric Company	Valmont, Colo.	4—1,400
[1]Detroit Edison Company	Detroit, Mich.	6—2,900
[1]Allegheny County Steam Heating Company	Pittsburgh, Pa.	1—2,988
[1]Union d'Electricite	Vitry Station, Paris, France	4—1,655
[1]Cosden & Co.	West Tulsa, Okla.	8— 500
[1]Ohio Brass Company	Mansfield, Ohio	2— 350
[1]Farr Alpaca Company	Holyoke, Mass.	1— 100
Pejepscot Paper Company	Lisbon Falls, Me.	2— 375
[1]Illinois Electric Power Company	Peoria, Ill.	4—1,400
[1]Ford Motor Company	Iron Mountain Plant, Iron Mountain, Mich. (Sawdust Burning)	2—1,350
[1]U. S. Metals Refining Company	Chrome, N. J.	
[1]The Virginian Railway Company	Narrows, Va.	5—1,521
[1]Ford Motor Company	Twin Cities Plant, St. Paul, Minn.	2—1,350
[1]Ohio River Edison Company	Toronto, Ohio	4—2,000
[1]St. Joseph Lead Company	Rivermines, Mo.	2—1,000
[1]Tordson Coal Company	Stone, Ky.	3— 600
[1]Pennsylvania Cement Company	Bath, Pa.	1— 505
Ohio River Edison Co.	Toronto, Ohio	4—2,000
The Milwaukee Electric Railway & Light Company	Lakeside Station, Milwaukee, Wis.	8—1,750

[1]Not yet installed.
[2]Being installed.

Literature on Pulverize Fuel

It should be borne in mind that literature in the form of books on the subject of pulverized fuel has had difficulty in keeping abreast of the development of the art, and those who wish to study the subject must, therefore, rely upon information contained in the various excellent papers that are presented periodically by authorities. Among those that have recently come to the author's attention we would recommend the following: "Advantages to Be Gained by Pulverizing Canadian Fuels," by Col. Harlow D. Savage, appearing in full in the *Engineering Journal of Canada* (June, 1923); "Powdered Coal," an address delivered by Colonel Savage before the New York Section of the A. S. M. E., November, 1923." "Pulverized Coal," by F. W. Dean, read before the National Association of Cotton Manufacturers at their meeting in Boston, Oct. 31, 1923, and "Pulverized Fuel and Efficient Steam Generation," by David Brownlie, delivered before the Institute of Electrical Engineers in London, England, Dec., 1923. This last paper is one of the most complete and contains more detailed and reliable information on operating costs than any other recent publication.

Examples of Possible Savings

To bring home forcibly the importance of pulverized fuel from a dollars and cents point of view, we may say that during the past year studies have been made of the operating conditions in a number of Canadian steam plants where every facility was given for obtaining accurate costs and where the plant records were generally found to be complete for several years at least. Table C gives operating

TABLE C

Comparisons in three Canadian steam plants of the savings to be effected by changing from their present methods of burning coal to pulverized fuel.

	Plant No. 7	Plant No. 11	Plant No. 20
Average daily load	4,000 hp.	5,000 hp.	6,000 hp.
Present annual cost for fuel	$432,000	$600,000	$800,000
Present annual cost for labor	50,000	60,000	70,000
Total present cost of labor and fuel	$482,000	$660,000	$870,000
Coal consumption with pulverized fuel	$296,000	$450,000	$700,000
Labor	18,000	20,000	25,000
Total cost with pulverized fuel	$314,000	$470,000	$725,000
Estimated annual saving, gross	$168,000	$190,000	$145,000
Annual capital charge at 18%	23,000	34,000	27,000
Annual net saving	$145,000	$156,000	$118,000
Capital cost involved in changing to pulverized fuel	$150,000	$200,000	$165,000
Net yearly return	96%	78%	71%

NOTE: The operating conditions were entirely dissimilar on these three plants, and for this reason the savings effected bear no direct relation to the size of the plants.

The comparative fuel costs are based on using coal of the same price under both conditions. Further savings are possible by substituting lower grade cheaper coal in pulverized form.

figures for the year 1923 for three plants, and while these are not typical of the best, they at least are existing plants. By reference to the table it will be seen that the present costs are contrasted with figures showing the savings that would be guaranteed if powdered fuel were installed. It should be stated that substantial savings could be shown in these plants if they were remodeled and fitted throughout with modern stokers, but the savings would not be as great as with powdered coal. These three plants are widely separated and the details have been disguised so that their identity will not be recognized. Two of the plants are in the paper industry and one in a textile mill.

Installation for Pejepscot Paper Company

Fig. 2 shows a section and end elevation of a Lopulco pulverized fuel system recently installed at the Lisbon Falls plant of the Pejepscot Paper Company. The two boilers are each 375 hp., and it will be seen by reference to the cut they are served by one Raymond mill. No driers were included in this installation. Consulting engineers for this work for the Pejepscot Paper Company are the R. B. Wolf Company, of New York City. This installation was made in the latter part of 1923.

Considerable interest has already been shown by the industry in pulverized fuel, and it is expected that during the present year some

notable installations will be made which will not only increase the efficiency of burning coal or the grade at present used but will enable very much cheaper coals to be used.

Wood Refuse and Powdered Coal Burned Together

Barker and other wood refuse is a nuisance in most pulp mills and is now usually burned in some form of Dutch oven furnace usually fitted with stokers. The performance is never entirely satisfactory, the efficiency always low and the maintenance cost of furnace walls, arches and stokers high. Wood refuse is largely responsible for the appalling amount of dust and confusion seen in many boiler rooms. These elements all affect the cost of steam.

During the past two months careful investigation has shown that all wood refuse, whether wet or dry, can be efficiently burned in a hollow wall pulverized coal furnace simultaneously with powdered coal, provided the furnace volume is adequate. The maintenance cost will be negligible and whatever heat value the refuse has, less that required to evaporate its own moisture, will be made available for producing steam.

Sulphite Liquor Residue a New Fuel

For years waste sulphite liquor has been the subject of experiments and several processes have been developed that have for their purpose the reclaiming of one or more of the valuable constituents of the liquor. Recently a new process of evaporating the liquor has been perfected and we find that the dry, fine powder that remains after the water is all driven off, is an ideal powdered fuel. It contains about 8,200 B.t.u., needs no preparation, has practically no ash, burns at an efficiency of over 86 per cent, and if it can be produced for the cost figures shown the author of less than $3 per net ton, it will rapidly replace coal up to the full limit of the amount of residue that each mill can reclaim.

Ton of Pulp Yields Ton of Residue

It appears that the waste sulphite liquor from each ton of pulp made should yield nearly a ton of solid dry residue, and as each ton of pulp requires the steam produced from about 1,000 lb. of 12,500 B.t.u. coal, it would seem to follow that the 2,000 lb. of 8,200 B.t.u. residue should replace all the coal now used in producing steam for the manufacture of pulp, and if all this is true, the pulp mill of the future will buy no coal. This Utopian state is not yet here, but, nevertheless, dry sulphite liquor residue is a wonderful fuel if it can be produced by any process so that its cost per thousand B.t.u. is not greater than the cost of a 1,000 B.t.u. in coal.

TO AUCTION OFF TIMBER RIGHTS

To meet the requirements of the liquidation proceedings, the license rights to cut timber on 2,080 square miles of Crown lands leased by the International Land Company in the Lake St. John district, are to be sold by auction at the office of the liquidators, in Quebec, Messrs. Larue, Trudel and Pitcher, on April 14. The large limits were leased from the Provincial Government, under the usual conditions several years ago by Mr. Cleveland, of New York, acting in trust. Later they were transferred to the International Land Company, which had as promoter, Mr. Bates, of Ottawa. Four months ago the company went into liquidation. Very little work has been done on those limits and the water power forming parts of the rights of the company on the Salmon River has remained undeveloped. In that section of the province the permits have been sold as high as $1,000 and more per square mile. The Provincial Government is entitled to a transfer fee of $20 per square mile, according to the law.

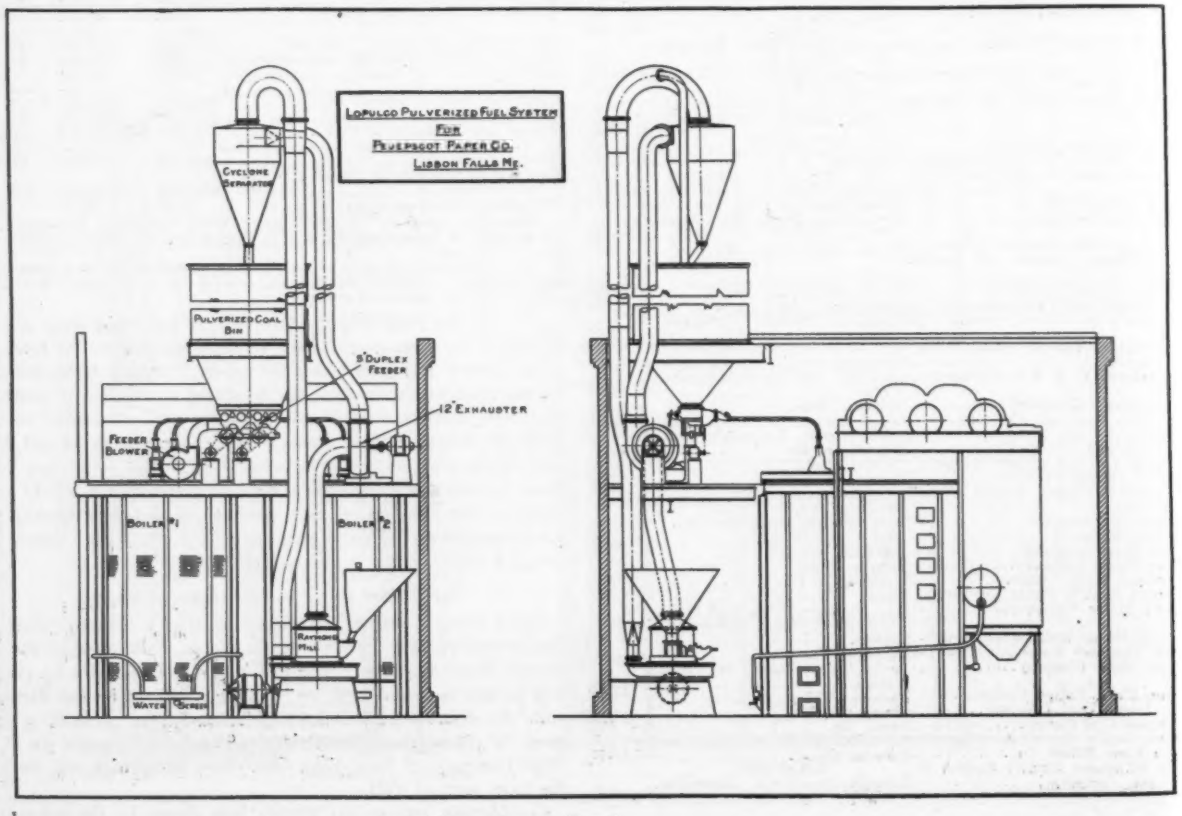


FIG. 2

Trade Banquets During Paper Week

American Paper and Pulp Association, National Paper Trade Association of the United States, and Salesmen Association of the Paper Industry Dine at Waldorf-Astoria—Technical Association of the Pulp and Paper Industry Holds Its Annual Banquet at Commodore—Waste Material Merchants' Association of New York City Has Banquet at the Commodore—All These Functions Are Largely Attended.

A thousand members and guests of the American Paper and Pulp Association gathered at the annual dinner of the organization in the grand ballroom of the Waldorf-Astoria Thursday night in the final event of the paper convention.

Julius H. Barnes, president of the Chamber of Commerce of the United States, was the principal speaker. He spoke very optimistically about the progress the paper industry has made during the past few years and pointed to the ever increasing consumption of paper in this country as a good omen for the future. He was followed on the program by Frederick P. Fish, chairman of the National Industrial Conference Board, and the Reverend W. Warren Gilles.

Henry W. Stokes Presides

Henry W. Stokes, who presided, was chairman of the banquet committee, and was ably assisted by G. G. Abernethy, A. Calder, L. H. Davey, Herman Elsas, A. S. Guggenheimer, C. F. Guild, W. Lloyd Heath, Roger B. Taft and G. M. Wetmore.

The dinner progressed to the tunes of many songs, old and new, sung by the entire assembly and with the usual visiting about among the tables of paper men from various companies.

The menu consisted of Cold Spring Harbor Oysters, Sorrel Soup with Toasties, Celery, Olives, Aiguillette of Sole a la Bonne Femme, Hollandaise Potatoes, Sweetbreads a la Florentine, Squab Chicken en Casserole, Hearts of Lettuce with Russian Dressing, Bombe Villeneuve Ice Cream, Assorted Cakes, Macaroons, Coffee, Cigarettes and Cigars.

After the coffee had been poured, Mr. Stokes, the toastmaster, introduced Mr. Barnes, who was received with applause.

Mr. Barnes' Address

Mr. Barnes' speech in part follows:

"There are certain trade indexes which may properly be regarded as great indicators of the progress of industry. There are other statistical indexes which visualize the living standards of a people, and therefore translate themselves into individual as well as national welfare. There are other statistical indexes which may fairly be properly interpreted in both the aspects of industry and the phases of human equation.

"For example, the index of iron production and consumption typifies that class of indicator which is primarily one of industrial progress. There are enthusiasts who trace the entire course of advancing civilization in the annual record of the increased use of iron and its metal products.

"In the second class may be ranked the health tables of our congested cities, the attendance figures in schools and colleges.

"But in the third class of indexes, which partake of the cold statistics of industry and are at the same time warm with human meaning, fall the indicators of progress in the paper trades. It is manifest that the printed page indicates by its rising production not only the spreading development of other industries which advertise their wares through the means of type, but indicates as well the more general spread of knowledge and information, on which not only the mentality and culture of a people must be based, but the enlargement of their earning power as well.

"It is of vast significance to the world that here in America six per cent of the world population produces annually, and converts to the manifold shapes that lend themselves to human use, practically half of the world's production of the basic materials of industry. It is of immense importance that the United States produces forty-three per cent of the world's coal, and consumes forty-two per cent; that it produces fifty-four per cent of the world's iron, and consumes fifty-three per cent; that it produces sixty-four per cent of the world's steel and consumes fifty-seven; that it produces forty-nine per cent of the world's copper, and consumes forty-four; that it produces sixty-four per cent of the world's oil, and consumes seventy-two; that it produces fifty-two per cent of the world's timber, and consumes fifty-one; that it produces sixty-nine per cent of the world's cotton, and consumes thirty-seven per cent.

"But above and beyond these striking figures of the accelerated conversion of the wealth of nature into forms of use through the basic processes of industry, runs the significance of the fact that six per cent of the world's population produces forty-three per cent of the world's production of print paper, and uses at home practically one-half of the entire world consumption.

"In its last analysis, the production and consumption of news print in this astonishing degree by six per cent of the world population is the greatest assurance of achieved progress in America, and holds forth the greatest promise for the expansion of world industry, year by year.

"If we have in America developed a new means of quick and ready transport which establishes marketing opportunity and economic independence to vast areas of production, without the enormous capital investment of the earlier railroad; if we have found in this great country such use of that agency of transportation that it has created a new marvel of industry, and, by the very earning power which it itself facilitates, found a market for the unprecedented aggregate of fifteen million automobiles, then the natural question arises as to why the new and undeveloped regions of the world will not, given political and financial stability, follow America's example?

"In the far-off areas of Asia and the Orient, South America, and Africa, potentially productive of the manifold things for which ready markets await if cheap conveyance were obtainable, they are also, because of that very fact, possessed of human labor scanty in employment, and therefore low in cost, which can construct the highways on which this new and cheap conveyance can begin the creation of a new web of commerce..

"In this picture comes with peculiar promise to the paper trades the fact that, through all the ages, the permanent record by which proven experience and knowledge is transmitted to succeeding generations, has been the major reliance of the world. The paper trades of America had their recent years of trial, accentuated by the

PICTURE TAKEN AT THE FORTY-SEVENTH ANNUAL BANQUET OF THE AMERICAN PAPER AND PU

ASSOCIATION AT THE WALDORF-ASTORIA HOTEL, NEW YORK, THURSDAY EVENING, APRIL 10, 1924

fact that war, and its aftermath, and the succeeding inconclusive peace, have checked, among Europe's three hundred million people whose living standards approach our own, the advancing living standards by which we prove the advancing standards of America.

"The whole leadership in living standards which America holds forth as the inspiration for the rest of the world rests on the demonstrated earning power which follows certain ideals, methods, practices and philosophies that are peculiarly American.

"From the very moment that highly productive industry became assured by the discovery of steam generation in 1781, America's industrial progress has been one of, first, slow, then rapid, development, of the harnessing of nature's forces to the service of industry.

"Now through this whole social structure, and responsive to the demands of industry which require knowledge and intelligence as never before, runs the sure assurance of undiminished demand and use for the printed page, for all it can print of accurate information and guidance. Here is a vision of enlargement for this industry which runs parallel with a justification of healthy profits which expanding industry should itself assure. So that it seems today there is a vista of promise of expansion of industrial and social reliance on the industry which prepares the sheet on which will be spread the information and knowledge which stimulates human activity and secures its earning power as well, that may well give a peculiar pride and confidence to this particular one of America's great industries."

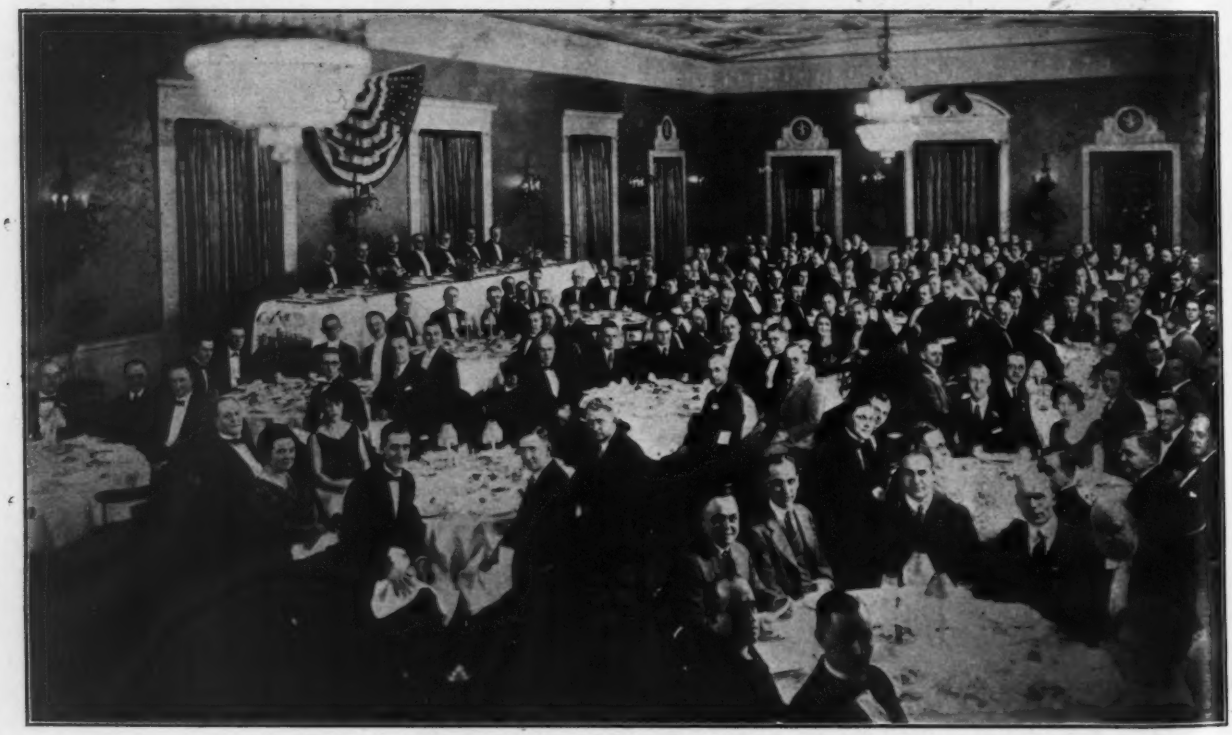
TECHNICAL ASSOCIATION BANQUET

About 225 attended the ninth annual dinner of the Technical Association of the Pulp and Paper Industry which was held at the Hotel Commodore on Tuesday night. After an enticing menu had been given proper attention, President Howard S. Taylor, presiding as toastmaster, spoke a few words of greeting. He then referred to the fact that this was the second year that the Association had held its banquet without the presence of Judge Charles Forrest Moore. He said it had been hoped up to the last that Judge Moore might be present but that was found impossible. Judge Moore had, however, penned a message for the occasion and Mr. Taylor called upon George Williamson to read it. The message was in verse. In it Judge Moore emphasized his faith in humanity and especially in his friends concluding with:

" * * * * * I will laud
My friends, my country and my God."

J. P. Jordan, President of the National Association of Cost Accountants, was called upon to show the relative bearing of costs on executive control. He said that the two were coupled up very nicely and expressed the opinion that too many executives overlook this essential to proper executive control. He analyzed industry from the day of the small industry with the executive who had intimate personal touch with his little organization to the day of big business when one man could not exert the same sort of personal touch through his great organization. In the former case consideration of costs might not have been so important but in the latter case it is vital. The speaker went on to explain how the World War brought a realization on the part of big business that it would have to know more about costs. Mr. Jordan then considered different types of executives. One mistake commonly made in selecting executives, he said, was in selecting men because they had made a record in some distinct branch of their business. There was no assurance that such men possessed the broad knowledge that would equip them for satisfactory service as general executives. He then told why the most fertile field for executives lay in the technical department. Technical men are analytical men and are trained to weigh all facts. And yet, he had a word of warning even for them. He cautioned them that as executives they would find it impossible to go into much that they might go into as technical men. Executive control, he said in conclusion, could not be a success unless it was carried out on a basis of facts.

Paul T. Brady of The Westinghouse Manufacturing Company



BANQUET OF THE TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY, HOTEL COMMODORE

BANQUET OF THE SALESMEN'S ASSOCIATION OF THE PAPER INDUSTRY, WALDORF-ASTORIA HOTEL

gave a most interesting talk on "Super-power." He traced the evolution of power from the animal power stage to the steam power stage, showing how slow the progress had been until the last one hundred years had seen the greatest advance and the past 30 years some of the real miracles of power progress. He also took a glance into the future. Today he said the power plants aim essentially to look after their own immediate localities but he pictured the possibilities of the future with great trunk line power facilities into which the various power plants will feed. "We have only started our power development," he declared in closing.

Edward Beck, secretary of the Canadian Pulp and Paper Association, spoke briefly of the progress which is being made along technical lines in Canada and referred to the talk of the previous speaker, saying that the waterpower topic was a large subject in Canada just now. He believed, he said, that the future development of the St. Lawrence was assured. Speaking more intimately of the pulp and paper industry he stated it as his belief that the time was coming when there would be no international lines in the industry.

A genuine surprise was sprung when Toastmaster Taylor announced that a very interesting document on paper making had recently been unearthed in China and that it would be read by Ki Lo, one of China's native sons. Ki Lo made a mysterious entrance dressed in native garb. He stood by the piano several minutes while the pianist rendered a Chinese medley. Then Ki Lo sauntered majestically to the banquet table and was at last recognized by many in the audience. Ki Lo was none other than R. S. Kellogg, secretary of the News Print Service Bureau. The parchment read by Mr. Kellogg disclosed the fact that Ki Lo, because of his marvellous experiments in early paper making, had been commended by Confucius and given an indeterminable lease on life that he might visit the various nations and further their exploits in the art of paper making.

When the gathering adjourned at 11:30 o'clock many were heard to express the opinion that the ninth annual dinner of the Technical Association had achieved a new record of success.

SALESMEN'S BANQUET

The entire American paper industry should combine in maintaining a corps of investigators in Europe and this country to see that shipments of foreign paper do not come in by illegal methods according to Henry A. Wise, well known New York attorney, addressing the dinner attended by 500 members of the Salesmen's Association of the Paper Industry at the Waldorf Astoria on Tuesday night. This was the substance of the so-called "Wise Plan" for meeting unfair foreign competition and stopping misclassification of imported papers at the customs houses.

"Practically every branch of the paper industry today is equipped to produce more than is normally needed," said Mr. Wise. "No mill has been operating at a hundred per cent capacity for the past twelve months. If these facts are correct then these mills should have produced every pound of paper used in America during the year.

"Such is not the case as you all know. European production has not only replaced from five to ten per cent of this, but it has materially affected the entire sales price of the entire American production. American production must be protected.

"I believe in protection of infant, adult or senile industry. No patriotism on the part of the consumers can take the place of this. Why not put an end to unfair foreign competition? In any other country an industry threatened with destruction would combine to fight. The Sherman law prevents this in the United States.

"We all know what happens when there is no protective tariff. Under the Cleveland tariff we had Coxey's army and terrible unemployment conditions. We would have had the same conditions under the Underwood tariff had it not been for the war, which really acted as a protective tariff.

"We are brought to one of two assumptions. Either the tariff rate is too low or there are some shenanigans being used to defeat the purpose of Congress. This foreign competition is said to be due to misclassification.

"There can be no complaint that there is not adequate machinery

PICTURE TAKEN AT THE ANNUAL BANQUET OF THE NATIONAL PAPER TRADE ASSOCIATION OF

THE UNITED STATES AT THE WALDORF-ASTORIA HOTEL, WEDNESDAY EVENING, APRIL 9, 1924

to deal with such a problem. But this machinery is not self operative. The Board of Appraisers must have facts and assistance from those who are in a position to furnish the facts.

"The situation in the paper industry is in a thoroughly unsatisfactory condition. The Wise Plan calls for an active and intelligent organization which would have to be backed by the whole industry in the United States. It would start in the foreign market and get every possible fact and follow the foreign paper until it is actually in the hands of the American consumer. Every manufacturer should lend a hand in furthering this plan.

"You insure your plants against fire. You insure your employes and your inventory. Why not insure yourselves against unfair and unlawful foreign competition."

Mr. Wise's speech was received with great enthusiasm although no definite action was taken pending the presentation of the plan to the entire American Paper and Pulp Association.

J. F. Fearing, president of the Salesmen's Association, presided. Before introducing Mr. Wise he praised the work of L. B. Steward, who founded the organization five years ago. Mr. Steward, who was seated at his right was asked to rise and received an ovation from the entire assembly.

After Mr. Wise had finished the toastmaster introduced H. W. Kaltenborn, associate editor of the *Brooklyn Eagle*, who spoke to the salesmen on current events.

WASTE MERCHANTS' BANQUET

Three hundred members of the Waste Merchants Association of New York attended one of the liveliest dinners in the history of the organization at the Hotel Commodore on Wednesday evening. Business was forgotten from 8 o'clock to 12 while the merchants strained eyes and ears to gather in every detail of the snappy entertainment provided by Walter H. Martens, chairman of the dinner committee, and his two able lieutenants, Charles Passannante and Alfred J. Moran.

The entire revue, made up of eight show girls of more than ordinary pulchritude and eight principals, was imported from the New Terrace Restaurant in the great hinterland of Brooklyn. Their songs and dances showed that the borough is little, if any, behind the Great White Way in talent.

The menu consisted of coupe carmen, croute au pot aux toastettes, lobster sante Americaine, fresh mushrooms on toast with fine herbes, breast of guinea chicken polonaise, string beans au gratin, potato fondante, salad moderne, fancy form ice cream, petit fours and cafe noir.

The following concerns had tables: American Woolstock Company, D. Benedetto, Box Board and Lining Company, Vito G. Cantasano, P. Cardinale & Son, George Carizzo & Co., Darmstadt, Scott & Courtney, Economy Baler Company, S. J. Fisher, Inc., Gaccione Brothers & Co., Gowanus Waste Products Company, Guariglia & Co., F. W. Katz, E. J. Keller & Co., Inc., P. M. Knight, Lincoln Melrose Co., George W. Millar & Co., Inc., A. J. Moran & Co., Inc., M. O'Meara Co., J. J. Patricoff Co., A. Ragone & Co., G. Ragone & Son, Wilson Paper Stock Co.

NATIONAL PAPER TRADE ASSOCIATION BANQUET

The fourteenth annual dinner of the National Paper Trade Association, held Wednesday night at the Waldorf-Astoria, will long be remembered even by those who have participated in most of the former events of the kind. It could hardly have been surpassed in its pleasurable features, and won its place as one of the outstanding ev ents of a week that has been a busy one for the people of the paper trade. About 500 claimed places at the tables, and the utmost good fellowship made the evening complete.

A reception occupied the half hour preceding the banquet, and it was after 7:30 when the summons to the banquet hall was given. Places at the tables were quickly located, and the assembly sang two verses of "America" before taking their seats. At each plate was an attractive menu which contained the complete words of "America," a list of officers of the association, the menu itself and a program of the entertainment features.

BANQUET OF THE WASTE MATERIAL DEALERS' ASSOCIATION OF NEW YORK, HOTEL COMMODORE

Conrad's orchestra played while the dinner was being served and again and again the gathering broke into song as such familiar airs as "Hail! Hail! the Gang's All Here!" and "It's Always Fair Weather" smote the ear. Everybody was in excellent voice, and the spontaneous singing rivaled that of pre-Volstead days.

The dinner was one to defy criticism, and the service was so capable that it was still an early hour when the entertainment began. The committee in charge of this feature had outdid itself. The New Wayburn office had been rifled of its choicest collection and the Ziegfeld Follies had been despoiled of some of their greatest drawing cards.

There was charming Ann Pennington of the laughing knees, whose skillful and vigorous dancing scored heavily, as it never fails to score anywhere. Then came Edna Leedom and Dave Stamper in their sketch, "Trying to Get Into the Follies," in which the former displayed the peculiar line of work which has made her a comedienne, perhaps, in a clas by herself, and in which the latter gave piano expression to some of his most popular songs, some of which the gathering knew and sang and whistled with him. Marjorie Whitney, a clever dancer, favored with two dances, one a Gypsy dance and the other a Toy Soldier fancy.

There were other acts ,each of which was heartily received. Nor should Will Morrissey be forgotten. As master of ceremonies he introduced the various acts in a most amusing way and incidentally provided a never failing flood of eccentricities which won him countless laughs.

The program was completed at 11 o'clock, and most of those present then repaired to the Astor gallery, where dancing was enjoyed until 1 o'clock.

When all has been said, it may still be added that the association has every right to pride itself on the success of its fourteenth annual banquet.

WAGES IN THE PULP AND PAPER INDUSTRY IN 1923

The Bureau of Labor Statistics, Department of Labor, has just completed a survey of the hours and wages in the paper and pulp industry in 1923. In its report the Bureau says:

Average earnings per hour, average full-time hours per week, and average full-time earnings per week in 1923 are here presented for employees engaged in the manufacture of paper and wood pulp in the United States.

The 1921 Census of Manufactures reported 105,294 wage earners in the paper and wood pulp industry. As these employees are not classified according to the divisions of the industry, only a general idea could be secured as to the manner in which the employees covered by this investigation should be allocated among the various branches of the industry.

Pulp mills are classified according to the method followed in reducing the wood to pulp, as ground wood, sulphite fiber, soda fiber, and sulphate fiber, and this study has been confined to mills making ground wood, sulphite fiber, and sulphate fiber. Paper mills are classified according to the kinds of paper produced, and this investigation has been confined to those mills whose principal product is book, news print, wrapping, or writing paper. Mills making manila (rope, jute, tag, etc.), heavy wrapping, straw, and bogus or wood manila paper have not been scheduled.

The data here summarized were taken by agents of the bureau directly from the pay rolls and other records of 199 mills located in California, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, New Hampshire, New York, Ohio, Oregon, Pennsylvania, Vermont, Virginia, Washington, and Wisconsin, which States, according to the 1921 Census of Manufactures, contain 90 per cent of the total number of wage earners in paper and pulp mills. The averages shown have been computed from individual hours and earnings of 26,050 paper and 13,011 pulp mill employees, constituting 37 per cent of all the wage earners in these industries in the United States.

Several establishments covered in this study are engaged in making more than one kind of paper, but whenever this occurs the establishment has been classified according to its main product.

The data summarized in the following tables were taken from a representative pay roll of each establishment covered. The data relating to pulp mills were taken from the March record of 23 establishments, the April record of 19 establishments, the May record of 34 establishments, the June record of 2 establishments, the July record of 2 establishments, and the August record of 1 establishment.

The data relating to paper mills were taken from the March record of 43 establishments, the April record of 28 establishments, the May record of 40 establishments, the June record of 3 establishments, the July record of 3 establishments, and the August record of 1 establishment. The great mass of the data is not, therefore, all for any particular month but for March, April, or May, 1923.

In the pulp establishments 49 one-week pay rolls and 32 half-month or two-week pay rolls were taken. In the paper establishments the corresponding numbers were 73 and 46, respectively.

It will be observed that for pulp manufacturing, figures are shown for 12,535 male employees in 81 establishments and 476 female employees in 15 establishments. The average earnings per hour of males in all occupations were 46.9 cents and of females 33.4 cents. The average full-time hours per week of males were 52.8 and of females 49.7. The average full-time earnings per week of males in all occupations were $24.76 and of females in all occupations $16.60.

Under book paper mills, figures are shown for 9,802 male employees in 34 establishments and 1,590 female employees in 31 establishments. The average earnings per hour of males in all occupations were 52.7 cents and of females 31.9 cents. The average full-time hours per week of males were 51.4 and of females 51.5. The average full-time earnings per week of males in all occupations were $27.09 and of females in all occupations $16.43.

Under news print mills it will be observed that figures are shown for 6,414 male employees in 40 establishments and for 82 female employees in 17 establishments. The average earnings per hour of males in all occupations were 58.9 cents and of females 32.9 cents. The average full-time hours per week of males were 49.4 and of females 50.3. The average full-time earnings per week of males in all occupations were $29.10 and of females in all occupations $16.55.

Under wrapping paper mills, figures are shown for 3,832 male employees in 24 establishments and 207 female employees in 22 establishments. The average earnings per hour of males in all occupations were 52.8 cents and of females 30.2 cents. The average full-time hours per week of males were 52.4 and of females 52.7. The average full-time earnings per week of males in all occupations were $27.67 and of females in all occupations $15.92.

Under writing paper mills, figures are shown for 3,216 male employees in 20 establishments and 907 female employees in 20 establishments. The average earnings per hour of males in all occupations were 55.1 cents and of females 37.9 cents. The average full-time hours per week of males were 51.3 and of females 51.2. The average full-time earnings per week of males in all occupations were $28.27 and of females in all occupations $19.40.

Studying the several occupations, it is seen that the average earnings per hour of males in pulp mills ranged from 42.2 cents for laborers to 70.2 cents for cooks, sulphite; in book paper mills from 43.1 cents for laborers to 82.5 cents for machine tenders; in news print mills from 43.7 cents for laborers to 94.3 cents for machine tenders; in wrapping paper mills from 43.2 cents for laborers to 83.2 cents for machine tenders; and in writing paper mills from 43.3 cents for laborers to 89 cents for machine tenders.

The days of operation in the 12 months ending March 31, 1923,

for 196 pulp and paper mills ranged from 6¹ to 365, the average being 298 days. For pulp mills the days of operation ranged from 6¹ to 365, the average being 298 days. For book paper mills the days of operation ranged from 236 to 311, the average being 299 days; in news print mills the days of operation ranged from 158 to 317, the average being 300; in wrapping-paper mills the days of operation ranged from 258 to 311, the average being 304; and in writing paper mills the days of operation ranged from 221 to 311, the average being 284. The difference between the average days of operation and a possible full time of 313 week days was due to the following conditions: In the pulp mills, 15 establishments were closed by lack of orders or business depression from 5 to 359 days; 9 pulp mills were closed for holidays from 2 to 16 days; 32 pulp mills were closed because of lack of power from 2 to 157 days; and 18 pulp mills were closed for repairs from 1 to 94 days.

Likewise 12 book paper mills were closed by lack of orders or business depression from 6 to 69 days; 34 were closed for holidays from 2 to 8 days; 4 were closed because of lack of power from 3 to 15 days; 6 were closed for repairs from 3 to 20 days; 2 were closed for lack of materials for 11 days; and 1 was closed 12 days for vacation.

Two news print mills were closed by lack of orders or business depression 105 and 151 days; 37 were closed for holidays from 2 to 6 days; 4 were closed because of lack of power from 1 to 18 days; 11 were closed for repairs from 1 to 21 days; and 5 were closed for lack of materials from 4 to 7 days.

Two wrapping paper mills were closed by lack of orders or business depression 14 to 16 days; 24 were closed for holidays from 2 to 5 days; 3 were closed because of lack of power from 2 to 7 days; and 5 were closed for repairs from 1 to 51 days.

Ten writing paper mills were closed by lack of orders or business depression from 2 to 93 days; 20 were closed for holidays from 2 to 7 days; 2 were closed by lack of power 3 days each; 9 were closed on account of repairs from 3 to 28 days; 1 mill was closed 6 days for inventory; and 1 mill was closed 6 days on account of strike.

AVERAGE FULL-TIME HOURS PER WEEK, EARNINGS PER HOUR, AND FULL-TIME EARNINGS PER WEEK IN PAPER AND PULP MILLS, 1923, BY OCCUPATION AND SEX

PULP MILLS

Sex and occupation	Number of establishments	Number of employees	Average full-time hours per week	Average earnings per hour	Average full-time earnings per week
Male					
Barker men	35	290	52.2	$0.448	$23.39
Splitter men	36	119	52.5	.451	23.68
Chipper men	54	200	53.7	.455	24.43
Grinder men	50	1,054	52.0	.497	25.84
Acid makers	47	128	53.6	.617	33.07
Cooks, sulphite	47	139	53.7	.702	37.70
Cooks, sulphate	12	32	54.8	.574	31.46
Blow-pit men	46	175	51.7	.474	24.51
Diffuser men	13	37	55.1	.505	27.83
Evaporator men	12	32	54.8	.496	27.18
Recovery men	12	133	57.7	.436	25.16
Caustic men	12	34	57.2	.499	28.54
Screen men	55	292	53.0	.467	24.75
Head pressmen	54	191	53.3	.562	29.95
Pressmen	70	992	50.7	.466	23.63
Rag workers	15	125	51.5	.450	23.18
Rag-washer men	14	62	49.0	.554	27.15
Laborers	81	5,193	53.2	.422	22.45
Other employees	81	3,307	53.0	.515	27.30
All occupations, male	81	12,535	52.8	.469	24.76
Female					
Rag sorters	15	426	49.7	.330	16.40
Rag workers	7	50	49.8	.372	18.53
All occupations, female	15	476	49.7	.334	16.60
All occupations, male and female	81	13,011	52.7	.464	24.45

BOOK-PAPER MILLS

Sex and occupation	Number of establishments	Number of employees	Average full-time hours per week	Average earnings per hour	Average full-time earnings per week
Male					
Beater engineers	33	247	48.8	$0.697	$34.01
Beater men	34	1,005	49.9	.488	24.35
Size makers	31	48	54.6	.490	26.75
Machine tenders	34	453	49.2	.825	40.59
Back tenders	34	476	49.1	.609	29.90
Third hands	32	409	49.3	.514	25.34
Fourth hands	24	289	48.6	.477	23.18
Coating machine runners	5	128	48.7	.613	29.85
Calender men	24	445	48.7	.577	28.10
Cutter men	22	204	52.7	.470	24.77
Plater men	2	10	54.4	.567	30.84
Trimmer men	17	106	51.7	.585	30.24
Packers	32	476	53.2	.517	27.50
Laborers	34	1,205	53.6	.431	23.10
Other employees	34	4,301	52.3	.512	26.78
All occupations, male	34	9,802	51.4	.527	27.09
Female					
Cutter girls	26	385	51.3	.331	16.98
Plater girls	2	35	50.0	.336	16.80
Sorters	17	563	52.0	.307	15.96
Counters	23	313	51.7	.320	16.54
Other employees	18	294	50.6	.319	16.14
All occupations, female	31	1,590	51.5	.319	16.43
All occupations, male and female	34	11,392	51.4	.498	25.60

NEWS PRINT MILLS

Sex and occupation	Number of establishments	Number of employees	Average full-time hours per week	Average earnings per hour	Average full-time earnings per week
Male					
Beater engineers	38	138	48.3	$0.717	$34.63
Beater men	33	445	48.0	.457	21.94
Size makers	13	14	51.9	.488	25.33
Machine tenders	40	418	48.0	.943	45.26
Back tenders	40	419	48.0	.758	36.38
Third hands	40	407	48.0	.641	30.77
Fourth hands	37	335	48.0	.513	24.62
Cutter men	18	53	50.6	.469	23.73
Trimmers	4	7	52.3	.455	23.80
Packers	40	361	49.5	.468	23.17
Laborers	40	1,011	50.3	.437	21.98
Other employees	40	2,806	50.1	.600	30.06
All occupations, male	40	6,414	49.3	.589	29.04
Female					
Cutter girls	17	65	49.4	.339	16.75
Other employees	3	17	54.0	.290	15.66
All occupations, female	17	82	50.3	.329	16.55
All occupations, male and female	40	6,496	49.3	.585	28.90

WRAPPING PAPER MILLS

Sex and occupation	Number of establishments	Number of employees	Average full-time hours per week	Average earnings per hour	Average full-time earnings per week
Male					
Beater engineers	24	84	55.1	$0.708	$39.01
Beater men	24	410	51.1	.470	24.02
Size makers	13	18	54.3	.506	27.48
Machine tenders	24	234	51.2	.832	42.60
Back tenders	24	235	51.2	.638	32.67
Third hands	24	222	50.8	.543	27.58
Fourth hands	21	195	50.1	.468	23.45
Calender men	2	5	50.4	.614	30.95
Cutter men	18	54	53.1	.492	26.13
Trimmers	9	13	54.9	.497	27.29
Packers	23	248	53.7	.462	24.81
Laborers	24	614	52.5	.432	22.68
Other employees	24	1,480	53.3	.528	28.14
All occupations, male	24	3,832	52.4	.528	27.67
Female					
Cutter girls	19	119	52.6	.305	16.04
Counters	11	65	53.0	.299	15.85
Other employees	6	23	52.4	.297	15.56
All occupations, female	22	207	52.7	.302	15.92
All occupations, male and female	24	4,039	52.4	.517	27.09

WRITING PAPER MILLS

Sex and occupation	Number of establishments	Number of employees	Average full-time hours per week	Average earnings per hour	Average full-time earnings per week
Male					
Beater engineers	20	95	50.6	$0.843	$42.66
Beater men	20	436	51.4	.495	25.44
Size makers	19	34	53.8	.506	27.22
Machine tenders	20	168	49.4	.890	43.97
Back tenders	20	173	49.5	.634	31.38
Third hands	20	152	49.6	.510	25.30
Fourth hands	6	31	48.0	.471	22.61
Loft men	5	46	49.3	.606	29.88
Calender men	16	90	50.8	.569	28.91
Cutter men	17	121	52.0	.500	26.00
Plater men	8	28	50.9	.705	35.88
Counters	3	11	50.0	.557	27.85
Trimmers	19	84	52.1	.623	32.46
Packers	20	202	52.4	.528	27.67
Laborers	20	396	52.3	.433	22.65
Other employees	20	1,149	51.6	.532	27.45
All occupations, male	20	3,216	51.3	.551	28.27
Female					
Cutter girls	14	164	51.3	.322	16.52
Plater girls	8	218	50.1	.414	20.74
Sorters	14	160	51.1	.389	19.88
Counters	16	213	52.5	.358	18.80
Other employees	14	152	51.1	.408	20.85
All occupations, female	20	907	51.2	.379	19.40
All occupations, male and female	20	4,123	51.3	.513	26.32

SECOND PAPER SHOW BIG SUCCESS

Representative Paper, Paper Making Machinery and Supply Concerns Make Fine Exhibit at Grand Central Palace

Show Is Largely Attended Throughout the Week by Manufacturers Attending the Annual Convention of the American Paper and Pulp Association, Large Consumers of Paper and Other Visitors—Displays, As a Rule, Are Larger Than the Fine Exhibit Made Last Year—Technical Association Holds Sessions at the Show—Moving Pictures of Paper Making Proves Interesting Feature to Big Crowds

By Dr. Arthur Selwyn Brown and Herbert J. Laughton

The Second Annual Paper Industries Exhibition opened in the Grand Central Palace, New York on April 7, on scheduled time with a splendid display of machinery, supplies, paper, paper goods, pulp processes and a large number of products, appliances, chemicals, materials, and instruments employed in the numerous associated industries. This year's exhibition was much superior to the fine showing made last year. This was made possible by the show being held on the ground floor of the building, which is architecturally far more imposing than the upper floor used last year, and by the finer displays and finely decorated booths of the exhibitors. The firms whose efforts contributed to the splendid success of this year's exhibition showed their zeal by the manner in which they arranged their booths and had them effectively furnished early in the morning of the opening day. Their foresight and enthusiasm were abundantly rewarded by the numerous friends they made with out-of-town visitors and the actual and prospective business done.

This exhibition enabled the Convention visitors, and others, who were numerous throughout the week, to gain a complete insight into the present status of the paper and allied industries, from the preparation of the pulp to the making of all the standard types of paper, including a number of fancy and colored papers, and so gauge the improvements following recent changes in various processes and machinery.

Visitors Manifest Intense Interest

Visitors showed intense interest in the many educational features of the exhibits. Exhibits like those of the Seaboard Air Line Railroad which demonstrated the different kinds of paper made from woods in the Southern states, and specimens of the woods and pulps, maps showing forest areas and mill locations; the New York State College of Forestry, exhibit, which emphasized the enormous inroads the paper mills are making in our pulpwood resources and the increasing necessity for making effective efforts to prepare for future requirements by systematic reforestation and showed the broad scope of subjects required by students qualifying for pulp and paper manufacturing experts; and the chemical exhibits which displayed dyes and lake colors used in the paper trades and the numerous beautiful shades of colored papers obtained by their agency. Many of these effective exhibits vied with some of the machine and scientific instruments and process exhibits in attracting and holding the attention of visitors, both those connected with the paper trade and the general public. The imposing exhibits of a sectional driving unit of a paper machine drive made by the Westinghouse Electric and Manufacturing Company; the Vickery felt conditioner and Pulmax drive of the Bird Machine Company; the machine rolls and winding machines of the Cameron Machine Company; the suction rolls of the Downingtown Manufacturing Company; the Nash Engineering Company's vacuum pumps and their machinery exhibits; Smidt & Co.'s Lenix belt drive units; the Valley Iron Works screens, laboratory beaters and size testers; the Jeffrey material handling machines; and many other exhibits were highly commended by technical visitors who frequently testified to their high appreciation of the exhibition, which they declared to be valuable illuminative and abundantly interesting.

The New York State College of Forestry

A splendid exposition of the need of forestry and lumber conservation was given by the New York State College of Forestry by beautifully colored glass slides showing why we need forests of timber suited to the pulp industries; the enemies of forest trees; the latest methods employed in forest protection and in reforestation. Maps showing the principal pulp timber reserves and a splendid collection of scientific booklets covering the whole wide field of forest building and preservation were exhibited in the college's wonderfully instructive booth, and the competent attendants were able to inform the visitors who flocked there throughout the exhibition week that forest building by means of reforestation is a subject of increasing importance worthy of the attention of all who appreciate the value of our great national resources and industries and of the vigilance needed in assuring their proper use. They were able to demonstrate that out of more than twelve million acres of forest lands in the State of New York alone, more than one-third are allowed to remain idle and unproductive. Similar conditions prevail in many other states. Today it is estimated that more than three-fifths of the forest timber we once possessed have been consumed or destroyed and the paper industries are annually consuming more and more pulpwood. There are many indications that we are living beyond our timber income and destroying our pulp reserves at the same time. Unless we help the forest builders, it will be only a question of a comparatively short time when our great paper industries will become more and more dependent upon foreign sources of supplies for their raw materials. These and other great lessons were strongly and persuasively brought to the attention of visitors by this important exhibit and its well-informed attendants.

The Seaboard Air Line Railway

One of the most striking exhibits at the show was that of the Seaboard Air Line Railway. A large map showing the states traversed by the Seaboard Air Line Railway was displayed in the background of the exhibit, and was used to demonstrate the fact that the road serves the greatest wood pulp section of the United States. Among the many interesting features shown were: Unbleached pulp from Southern pines; bleached gum pulp; unbleached pulp from Southern gum; unbleached Kraft pulp from Southern pines; Carolina fiber wrapping papers; various specimens of lime-

stone, of which the South has unlimited quantities; Georgia Kaolin, from near Macon, Ga.; long leaf pine seedlings, one year from seed, and a series of interesting photographs, descriptive of the wonderful resources of the South. Samples of wood produced in Dougherty County, Georgia, were also exhibited, through the courtesy of the Albany, Ga., Chamber of Commerce.

The J. O. Ross Engineering Corp.

An exhibit of a model of a vapor absorption system on a paper machine in connection with a Briner economizer was a feature in the booth of the J. O. Ross Engineering Corporation. The so-called cross ventilation consisting of varying the ventilating air sideways through paper making machines and so eliminating vapor pockets and enlarging the moisture carrying capacity of the air, is one of the recent developments used with Briner economizers.

Smith & Serrell

Franke flexible couplings were demonstrated by Smith & Serrell, Newark, N. J., agents of the J. O. Ross Engineering Corporation. Working models of new high speed and pressed steel couplings using laminated spring construction to enlarge their flexibility and improve their durability and reliability showed the latest improvements attained in couplings suitable for machinery running at extremely high speeds and the latest devices employed for lubricating them.

The Reed Air Filter Co.

The need for coping with the increased atmospheric dust and soot charges in many manufacturing centers has led to the development of Reed air filters. This system is based upon the natural principle of animal purification in which the air passing through the nostrils is caused to pass over a large surface containing an adhesive element. Adhesive is the chemical used in the Reed filter to act like mucus. It is an odorless, tasteless, non-volatile liquid which has a strong attraction for dust and carbon. It is estimated that Reed filters, when effectively operated, remove fully 97 per cent of the dust, carbon and bacteria in the air passed through them.

The Crane Co.

A wide variety of types of Crane valves were shown in the booth of the Crane Company of Chicago. Particularly interesting was an exhibit of Crane Y stop-check valves used in pipe lines between boilers and the main line or header, when a series of boilers are connected with the same header or line. In the event of a tube blowing out, or the bursting of a joint in a boiler lead to which a stop-check valve is connected, this valve will close instantly and automatically, cutting out the boiler and acting as a non-return valve to prevent the back-flow of steam from the main. This Y stop-check valve also acts as a safety stop valve preventing any steam from entering or backing into a closed boiler while men are engaged in making repairs.

Hoffman blast traps exhibited by the Crane Company showed the latest method employed for draining condensation from indirect radiators, blast or verito stacks, ends of steam mains and risers, driers and drums, hot water generators, laundry machinery, unit heaters and other appliances. Numerous diagrams were shown in addition to various sizes of traps, which demonstrated the correct way for operating this type of trap.

F. L. Smidth & Co.

Long center belt drives are necessary in many mills, but in some cases, it is possible to adopt short center drives to handle the same work more efficiently. The Lenix short drive of the Lenix System exhibited by F. L. Smidth & Co., of New York, has proved itself to be superior for most purposes to long center drives. It acts by gravity and automatically and constantly maintains the proper tension on the slack side of the drive. Counterweights enable the accurate adjustment to the normal to be simply made. This system automatically adjusts itself to peaks and valleys in the load movements.

This firm also exhibited horizontal and vertical drives for beaters. Many mills are using these drives in connection with either individual or double headed motor drives. Drives of this type are specially designed to suit any peculiar characteristics of beater drives.

American Schaeffer & Bundenberg Corp.

An interesting display of many ingenious and scientific instruments was made in the booth of the American Schaeffer & Bundenberg Corporation, Brooklyn. This firm is famous for its pressure and vacuum gauges, locomotive mercury gauges, dial thermometers, tachometers, steam traps and valves, indicators and indicating appliances, calorimeters, feed-water filters and many other machinery adjuncts. A large line of instruments adapted for the promotion of efficiency and perfection of products of the paper-making and allied industries was shown and demonstrated. Many of these valuable instruments proved attractive to the public.

American Engineering Co.

Fuel economizing becomes increasingly necessary in all mills on account of the high cost of fuel and the increasing competition brought about by general economic conditions. The American Engineering Company, Philadelphia, representing the Taylor Stoker Company, Ltd., Toronto, Canada, exhibited drawings and diagrams showing the principles upon which the Taylor underfeed stoker is designed for economizing boiler fuel. It contains a distributing ram which forms the entire bottom of the retort. This is a distinguishing feature which gives flexibility and positiveness of control of the fuel from the hopper to the ash pit. Other features of the Taylor stoking system assure the capacity of boilers fitted with it to meet sudden and heavy fluctuations in steam demands such are often required in paper mills. This system is installed in many large paper mills both in the United States and Canada.

Keystone Lubricating Co.

A fine showing was made of samples of Keystone lubricators, paper mill greases and other articles made by the Keystone Lubricating Company, Philadelphia, Pa., in its interesting and well displayed booth. Engineering experts demonstrated to mill men the various effective properties of this company's products.

R. & J. Dick Co., Inc.

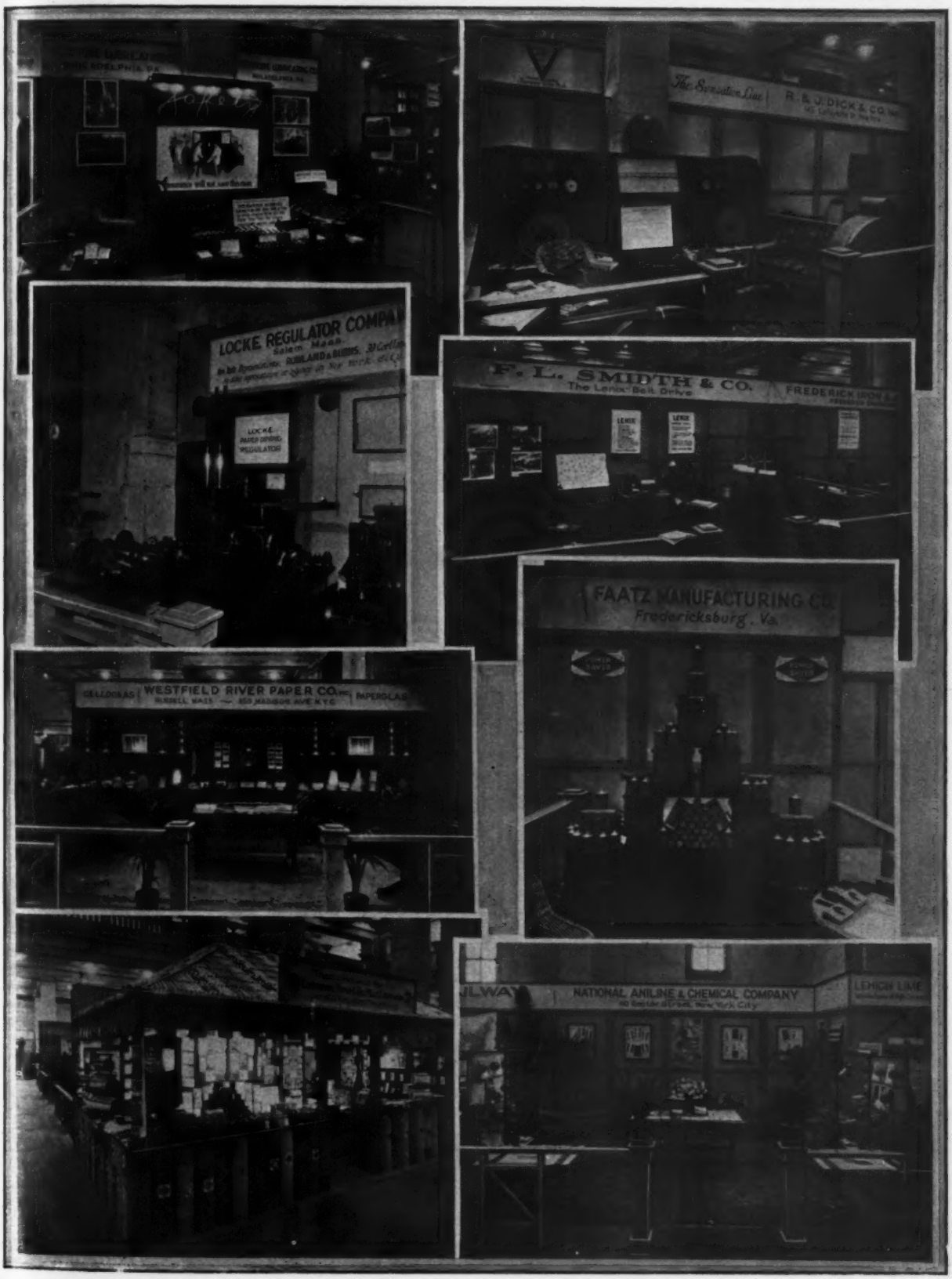
Balata belting, the internationally famous product of the factories of R. & J. Dick Company, Passaic, N. J., was an attractive feature of this firm's booth. Balata belting was put on the world's markets in 1885, when a shortage of heavy leather became apparent, and has been made in increasing quantities each year since that date. It is manufactured by applying balata rubber gum to cotton duck by complete or absolute impregnation. The care taken in the construction of this type of belting assures great flexibility together with uniformity, strength and durability.

The Hoe Corp.

The ingenious instantaneously adjustable wrench made by the Hoe Corporation, Poughkeepsie, N. Y., was exhibited in that company's booth. It was demnstrated that it grips and never slips when in use. This wrench grips from the front and has an excellent ratchet movement. It is manufactured from choice drop-forged manganese high carbon steel, in five sizes, and is adaptable to all classes of work. It gives good service in heavy work, in mud, sand and dust it will not clog, and will hang to overhead piping without falling, and it can be operated in very close quarters. This is a very handy tool.

Voorhees Rubber Mfg. Co.

Rubber belting, hose and rub-steel valves on the Sensation principle were exhibited by the Voorhees Rubber Manufacturing Company, Jersey City, N. J. Sensation belting is constructed of a compact duck and a specially prepared rubber. The plies of the duck are held together by friction which resists external heating


LOCKE REGULATOR COMPANY
Salem, Mass.
F. L. SMIDTH & CO.
The Lenix Belt Drive
FAATZ MANUFACTURING CO.
Fredericksburg, Va.
WESTFIELD RIVER PAPER CO.
NATIONAL ANILINE & CHEMICAL COMPANY
LEHIGH LINE

and is impervious to deterioration through moisture and climatic and working conditions. It is an efficient and adaptable type of belting of wide usefulness in paper mills which has a host of friends among mill engineers.

The Faatz Mfg. Co.

Power-Saver, a preparation adaptable to all kinds of belts and rope drives, was a feature of the booth of the Faatz Manufacturing Company, Fredericksburg, Va. This preparation, which is made in various grades of liquid and powdered forms, makes belting waterproof, impervious to oil, acid fumes and other injurious elements and reduces the natural slip of all types of belts.

Westfield River Paper Co.

Various types of beautifully embossed glassine papers, plain glassine, celloglas, silver coated and other types of fine papers were exhibited by the Westfield River Paper Company, Russell, Mass. The various uses to which these special types of paper are put were also demonstrated.

Kleen Products Co.

A wide line of fiber plates, cups, spoons, forks, luncheon sets and other household goods were shown by the Kleen Products Company, North Wales, Pa. This company successfully manufactures a new type of fiber plate closely resembling porcelain plates, with deep dishing, and a clean cut, smooth finish. The Kleen hair comb made of pure cotton fiber surfaced like old ivory, a sanitary personal article of wide ability as an advertising medium as well as a highly sanitary toilet article for travelers, institutions, trains, hotels and schools, was a feature of this company's booth.

American Association of Paper Specialty Manufacturers

An educational exhibit of considerable attractiveness was made in the booth of the American Association of Paper Specialty Manufacturers, who showed a variety of types of lily cups and containers, Stone's seamless straws, and other similar articles.

Papermakers Chemical Co.

A model of a wooden hand paper press was the feature of the booth of the Paper Makers' Chemical Company, and the Western Paper Makers' Chemical Company. Daily demonstrations were given of the process for making high-grade hand-made papers. Samples of the complete lines of these companies' products were also shown.

Seminole Chemical Co.

The Seminole system of boiler-cleaning was demonstrated in the booth of the Seminole Company, New York. The preparation used by this company brings the scale down in the form of sludge and prevents the re-appearance of scale while it is used. This company offers a free consultive service to mill-men regarding boiler cleaning problems.

American Voith Contact Co.

A working model demonstrating the practical operation of the Voith Caterpillar grinder proved of considerable interest to mill men visiting the booth of the American Voith Contact Company, New York city. This efficient machine reduces slivers to less than 50 per cent of the amount made in ordinary mills. This company also showed Hercules artificial grindstones for wood pulp manufacturers and a working model of the Voith high pressure stock inlet, which is a very effective installation for flow boxes. It accurately adjusts the flow so that a pulp sheet of uniform thickness over the entire width of the wire can be obtained.

Westinghouse Electric & Mfg. Co.

The Westinghouse system of sectional drive includes many features which are not obtainable with any form of mechanical drive. These features contribute, to a large extent, to the efficiency and convenience of the paper machine. The demonstration of this sectional driving unit by the Westinghouse Electric and Manufacturing Company, of East Pittsburgh, Pa., was a magnet which drew the attention of every visitor to the show, and was unanimously conceded to be one of the most striking and valuable exhibits at the exposition, both from an educational and a technical standpoint. This system consists of a Type SK motor, coupled to a parallel shaft, single reduction gear, both of which are mounted on a common bedplate with a chain driven speed changer and rotary contractor; a master rotary contractor unit; a sectional control panel, and a master control panel. This equipment was not connected to any load, but was demonstrated in operation from start, fast, slow and stop, push buttons. Speeds in terms of feet per minute of paper were shown by an electric indicating device. Types WK-10, WK-55, W-20 safety switches, a table of micarta products, lamp reflectors suitable for paper mill illumination, and Types X and Y alternating current meters, were also effectively displayed by the Westinghouse Electric and Manufacturing Company.

Norma Company of America

The Norma Minimeter, a true precision measuring instrument, was demonstrated at the attractive booth of the Norma Company of America, whose headquarters are at Long Island City, New York. After once being set to a standard, this valuable instrument combines exactness with commercial adaptability, eliminating the personal error and permitting measurements to be made with great rapidity. It brings to the measurement of ordinary bench and machine work the precision hitherto not available even by elaborate and expensive methods. Hoffman precision roller bearings for heavy loads and hard service were displayed. These heavy-duty units are manufactured to unequalled standards of precision; affording the maximum of serviceability under conditions involving heavy loads, temporary overloads, shock, jar and vibration; offering to manufacturers and users of paper and pulp mill machinery new opportunities for power saving, reduced upkeep costs, and better service. Norma precision open type annular ball bearings, Norma precision closed type annular ball bearings, Norma ball thrust bearings, and Hoffmann ball thrust bearings are also featured in this notable display.

Oneida Chuck Co.

The Oneida Chuck, a new patented chuck for holding Jumbo rolls wound on paper cores, was shown at the stand of the Oneida Chuck Company, of Rhinelander, Wis., and attracted great interest. This chuck is designed to eliminate the use of wood, iron and metal-tipped cores. It is extensively used by news print users, converters and mills, for inter-plant work, and allows the use of cheap non-returnable paper core, without loss of paper. Time and labor is saved in loading cars by use of this chuck and paper cores, on account of it not being necessary to deduct the weight of the cores.

Marlin-Rockwell Corp.

The feature of the exhibit of the Marlin-Rockwell Corporation, of Jamestown, N. Y., successor to the Gurney Ball Bearing Company, was a breast roll mounting, manufactured by the Bagley & Sewall Company, of Watertown, N. Y., and equipped with Gurney ball bearings. In addition, a complete line of the well-known Gurney ball bearings were displayed. The Marlin-Rockwell Corporation manufactures a standard line of bearings and meets the special requirements of engineers' specifications.

The Dorr Co.

The Dorr Save-All, of semi-commercial size, was shown in actual operation, recovering waste stock from white water. The Dorr Save-All, which is manufactured by the Dorr Company, engineers, of New York, Denver and London, England, consists of a steel tank with a number of trays dividing it into settling compartments, all connected by central openings in the trays. A slowly revolving central shaft carries radial arms with squeegees, each arm sweeping the bottom surface of a compartment. The white

GENERAL ELECTRIC COMPANY
ONEIDA CHUCK CO.
Rhinelander, Wis.
WESTINGHOUSE ELECTRIC & MFG. CO.
East Pittsburgh, Pa.
AMERICAN SCHAEFFER & BUDENBERG CORP.
THE NORMA COMPANY OF AMERICA
FREDERICK IRON & STEEL
FREDERICK ENGINEERING CO.

water is fed continuously to the center of the top surface and distributes itself equally to each compartment. The stock settles in each compartment, is gently swept to the central openings by the revolving sweepers and is drawn off through a discharge in the bottom. The clarified water overflows each compartment through a peripheral launder to waste or for rinse in the mill. The thickened stock is returned to the system by a centrifugal pump.

Nash Engineering Co.

At the large space occupied by the Nash Engineering Company, of South Norwalk, Conn., the Nash Hytor Vacuum Pump for suction roll and flat box service was demonstrated to innumerable interested visitors to the exhibit. The Nash Hytor, consisting of a rotor revolving in an elliptical casing exhausts air from the heating system and discharges to the atmosphere against atmospheric pressure only. The centrifugal impeller is of open design to prevent clogging which might be expected if an inclosed propeller were used for the small water capacity required for this unit. There is no metallic contact in the pump interior. The pump is bronze fitted throughout, having the air rotor, rotor housing, water impeller and shaft of bronze. Among other interesting features of this splendid exhibit were the Jennings Hytor Vacuum Heating Pump, electric motor driver, designed to exhaust a vacuum and return all condensation in connection with vacuum return line steam heating systems; the Jennings Hytor Vacuum Heating Pump, steam turbine driven, for return line heating systems and other vacuum work where liquid is handled with a gas; and the Jennings Hytor Condensation Pump, unit type, electric motor driven, designed to handle condensate from steam heating or drying systems.

The Booth Chemical Co.

Intense interest was evinced by visitors to the exposition in the operation of a new Type 24 Booth Dry Feeder. This machine, manufactured by the Booth Chemical Company, of Townley, N. J., is used in the application of Boothall—a chemically balanced dry powder coagulant, compounded on an alum basis—to white water pulp, saving coagulation, employed in the company's process for separating white water into its constituents, pulp and water. The pulp recovered is made into paper and the purified water is used instead of fresh water. All of the feeding elements are slow moving, and provide a continuous stream of Boothall, which can be regulated to suit the most exacting requirements.

Locke Regulator Co.

The Locke Improved Regulator for paper drying was featured at the booth of the Locke Regulator Company, of Salem, Mass. This regulator is unlike, both in construction and operation, any device that has heretofore been designed for this purpose. It not only controls the temperature of the driers when the paper is running over them, but maintains the same temperature whenever there is a break in the paper. This is conceded by paper manufacturers to be a very important feature in a regulator. This machine is most sensitive to any change in the temperature of the driers, yet it has been found to be perfectly reliable, and what is more, is not continually getting out of order. The Locke Regulator Company also displayed pressure regulators, pump governors, reducing valves, paper drying regulators, engine stop and speed limit systems, water regulators, etc.

Another interesting feature of the exhibit was the demonstration of the Locke Engine Stop and Speed Limit System, which is a safety device against overspeeding of the steam engine, and also a means of stopping the steam engine from a remote point in case of accident.

Pennsylvania Salt Manufacturing Co.

Industrial chemicals used by paper makers were displayed by the Pennsylvania Manufacturing Company, of Philadelphia, Pa. This widely known organization, which was incorporated so long ago as 1850, deservedly possesses an enviable reputation. Among the chemical products of the Pennsylvania Salt Manufacturing Company shown were Sulphuric Acid 60° (Oil Vitriol); Muriatic Acid 18°, 20° (Hydrochloric); Aluminum Sulphate (Sulphate of Ammonia); Natrona Porous Alum (Iron free); Natrona Concentrated Sulphate of Alumina (Iron free); Excelsior Sulphate of Alumina (commercial), all grades of which are used for paper, color, dye and tanning industries and water filtration plants; Bleaching Powder (Chloride of Lime, Bleach and Calcium Hypochlorite), for pulp, paper and textile uses and sterilizing water; Chlorine, liquid, in cylinders and tank cars; Caustic soda (solid and ground); soda ash, and Hypochlorite of Soda.

Shepard Electric Cranes and Hoists

Great interest was evinced by visitors to the exposition in the exhibit of the Shepard Electric Crane and Hoist Company of Montour Falls, N. Y. An electric Lift About hoist was shown in operation, and the remarkable economies effected by this powerful little ½ and 1 ton hoist in moving and lifting material of every description were ably demonstrated. For its superior design and construction, the Lift About is surprisingly low in price, and this is due only to standardized manufacture and quantity production. Enlargements from photographs taken of actual installations of electric travelling cranes, cage-controlled mono-rail hoists, and single I-beam type electric hoists, in the plants of paper manufacturers, were also displayed.

The W. S. Tyler Company

Hum-mer electric screens and testing sieves, and all types of woven wire screen used in the manufacture of paper, were featured at the booth of the W. S. Tyler Company, of Cleveland, Ohio. The Hum-mer electric screen undoubtedly makes screening more profitable, and screens from the coarsest to the finest material, either wet or dry, from 2½ inch opening to minus 200 mesh. Tyler Fourdrinier wires are made in brass, bronze, and phosphor bronze in all widths up to 250 inch. The records of one mill, producing 13-lb. tissue, show that a No. 70 Tyler Fourdrinier wire produced 743,990 lbs. of tissue and operated continuously without shutdown for wire repairs. This wonderful record speaks for itself.

Tide Water Oil Sales Corporation

Tycol lubricating oils and greases, specially manufactured for the lubrication of paper making machinery, were demonstrated at the booth of the Tidewater Sales Corporation, of New York. Tycol greases ease the way because they are manufactured from high grade Pennsylvania petroleum oil and are free from non-lubricating fillers and impurities. Tycol H T Wool Yarn Grease feeds to the shaft in much the same fashion as ice melts on one side only when applied to a heated surface. It feeds steadily from the mass of wool yarn and, because there is no oil separation, there is always an ample supply of lubricant in the box. The exhibit also included an interesting chart, which conveyed to the visitor the various phases of the lubrication of the Fourdrinier machine.

Cameron Machine Company

Three Camachines, representing three main types for production of small, medium, and large rolls of paper and paper boxes, were in operation and aroused great interest. The Camachine Slitting and Roll-Winding Machines are manufactured by the Cameron Machine Company, of Brooklyn, N. Y. Miscellaneous small rolls were actually made by Camachine 6, and the Cameron principle of slitting and winding, which is a characteristic of the entire line of Cameron machines, was thus exemplified. A Camachine Type 10 represented the middle stage, both in size of rolls produced and in the progress of development toward the high speed mill types, Camachine 12, Camachine 14, and Camachine 18. The Camachine 10, a standard machine for rolls of medium size, demonstrated that a roll winder of this capacity is advantageous in a great many mills, converting plants and paper warehouses, as well as in the factories manufacturing paper products. Mill men were specially inter-

THE GREETING CARD ASSOCIATION
NEW YORK
THE PURITY PAPER VESSELS COMPANY
BALTIMORE, MARYLAND
LEHIGH LIME COMPANY
J. O. ROSS ENGR CORPORATION
ROSS ENGR. of CANADA LIMITED
JOHN WALDRON CORPORATION
SMITH & SERRELL
BACHMEIER & COMPANY
RACO DYES FOR PAPER
MATHIESON
GENERAL ELECTRIC COMPANY
GENERAL ELECTRIC COMPANY

ested in Camachine 18, which does everything that a winder has to do, whether used as a prime winder behind the reels of the paper machine, or as a rewinder for finishing room service. A representative exhibit of rolls of different sizes, and various kinds of paper, all made on Camachines, was also shown in this fine exhibit.

Union Sulphur Co.

A convenient reception room was provided by the Union Sulphur Co., of 33 Rector street, New York, for the use of their many customers. The Union Sulphur Company are producers of high grade brimstone, which is absolutely free from arsenic or selenium. The Union Sulphur Company possesses the largest sulphur mine in the world at Calcasieu Parish, La.

United States Testing Co., Inc.

An actual demonstration of the more popular tests on paper was given at the booth of the United States Testing Company, Inc., of New York, Philadelphia, Paterson, New Bedford, and Shanghai. This included tests to determine the tensile and bursting strength of paper, and the folding endurance. Microscopic tests for the examination of the fiber were also demonstrated. The general chemical analytical work of the company, which is of particular interest to paper merchants, such as tests on coal, fuel oil, water, etc. was thoroughly explained. As is generally known, the United States Testing Company, Inc., is an independent fully equipped laboratory where samples of paper and pulp may be sent for analysis.

The Electric Tachometer Corp.

A great variety of indicating tachometers, recording tachometers, portable tachometers, position indicators and water level recorders were demonstrated by the Electric Tachometer Corporation of Philadelphia, Pa. The Tetco Liquid Level Recorder and Indicator was greatly admired. Recorder RR-760 is an accurate and reliable instrument for recording changes of relative position of mechanical parts, recording the travel of elevators or hoists, and for other similar applications. The Tetco Position and Displacement Indicator, the Tetco Tachometer M-200-SX, and the Tetco Recorder R-100, were also featured at this notable exhibit.

Midwest Steel & Supply Co., Inc.

A very thorough and convincing demonstration, showing how Midwest Air Filters are used to clear the air, and how they are used on electrical equipment, air compressors and internal combustion engines, was given at the booth of the Midwest Steel and Supply Company, Inc., of New York. Midwest unit air filters are claimed to be far superior to so-called wet washers in respect to cleaning efficiency and cost of maintenance, inasmuch as the very principle of Midwest design eradicates and does away with those elements necessarily required by wet washers. You simply force the dirty air through the Midwest unit air filters, and without the aid of water, pumps, or moving parts, the air is cleaned beyond a question of doubt.

Bird Machine Co.

Large crowds of interested visitors to the exposition were attracted to the wonderful exhibit of the Bird Machine Company of South Walpole, Mass. This enterprising organization demonstrated a Bird Rotary Inward Flow Screen, a Bird Save-All, a Bird Self-Cleaning Shower Pipe, a Vickery Felt Conditioner, a Vickery Doctor and a Pullman Short Centre Drive. The valuable factors of the Vickery Felt Conditioner, which was in operation during the week, were thoroughly explained to those interested. The Vickery Doctor was also mounted to enable the expert demonstrators to explain its many advantages. The Bird Self-Cleaning Shower Pipe was supplied with water and its principle was explained under actual operating conditions. An interesting arrangement of the Pullman Drive was shown in the form of a small model, from which comparisons of short centre drives against longer open belt drives were easily seen. The technical men connected with paper mills were very enthusiastic over this exhibit, and readily vizualized the working of the high grade Bird products.

The Sealright Co., Inc.

Sealright Liquid-Tight Paper Containers, including paper milk bottles, paper butter tubs, paper packing trays, printed discs, etc., were displayed at the booth of the Sealright Company, Inc., of Fulton, New York, and attracted much attention from the many visitors interested in the paper container industry.

Lehigh Lime Co.

Lime, an essential chemical to the paper industry, was represented in the exhibit of the Lehigh Lime Company, of Chicago. This is the first time that the lime industry has been represented at the Paper Industries Exposition. The Lehigh Lime Company, formerly the Mitchell Lime Company, manufactures high calcium chemical lime exclusively, specializing in the requirements of the paper industries. Nearly half of the output is shipped to paper mills for liquid chlorine bleach, sulphate, cooking of rag stock, strawboard, and for water treating. In addition to high available calcium oxide content, Lehigh lime has earned a reputation for rapidity and depth of settling, which is an important feature in connection with the liquid chlorine bleach and the sulphate process. The plant is located at Mitchell, Ind., on the Baltimore and Ohio and Monon Railroads. Being a subsidiary of the Lehigh Portland Cement Company, which operates two large cement plants at that point, the services of its extensive Traffic Department is available, insuring prompt, reliable service throughout the year. A Research Department is maintained by this company, for the purpose of giving assistance in all matters pertaining to the uses of lime. O. L. Cook and L. A. Dahl represented the Lehigh Lime Company at the Exposition.

Hammermill Paper Co.

One of the most artistic and attractive booths at the Paper Industries Exposition was that of the Hammermill Paper Company of Erie, Pa. In the background of the booth brilliantly colored panels illustrating scenes in the history of paper making, attracted tthe eye. Another innovation was an illuminated panorama showing actual photographs of the exterior and interior of the up-to-date plant of the Hammermill Paper Company, and pictures illustrating the gradual development of paper making, from its infancy to the present day. Specimens of all the different lines of paper that are produced by the Hammermill Paper Company were shown, in addition to some of the company's conversions and adaptations to general business requirements.

The Mathieson Alkali Works, Inc.

A large model of the Mathieson multi-unit chlorine gas tank car, which has recently been approved in an important decision of the Interstate Commerce Commission, was shown at the booth of the Mathieson Alkali Works, Inc., of New York, Philadelphia, Providence, Chicago and Charlotte. The model practically illustrated the many unique features of the multi-unit car, together with the unloading by means of a manifold and headers. A full-sized Mathieson ton container, as used on this car, was also exhibited and was sectioned at one end to show the construction in detail. Literature describing the Mathieson System for preparing bleach liquors from liquid chlorine were generously distributed, and samples of Eagle Thistle caustic soda, soda ash, and bleaching powder were given away.

The Permutit Co.

The principal feature of the exhibit of the Permutit Company, of New York, was the operation of a small size Permutit water softened. This apparatus occupies very little space in the plant and its simple operation does not require a skilled mechanic. Paper mill boilers will run just as efficiently, and just as econom-

ically as boilers elsewhere, when they are fed with Permutized water, and the resulting savings will quickly wipe out the purchase price of the water rectification equipment for the entire mill supply. The Permutit Company, is the largest exclusive manufacturers in the world of all types of equipment for treating water to render it pure, soft and correct for all manufacturing purposes.

The B. F. Goodrich Rubber Co.

A Goodrich Cutless bearing in actual operation with only water as a lubricant, aroused great interest from the many visitors to the exhibit of the B. F. Goodrich Rubber Company of Akron, Ohio. The Cutless bearing solves the lubrication problem by lubricating itself with water or any other liquid which the pump is handling and also solves the problem of cutting and scoring. The secret of the Cutless bearing is its inner surface of grooved olivite rubber. Another feature of this excellent exhibit was a high speed news press roll, after nine months' operation without showing any corrugation. The new Goodrich "1788" transmission belt, which is a vast improvement over all present types for paper mills, was also shown. The numerous interested visitors to the booth were permitted to make plastometer tests through the courtesy of the B. F. Goodrich Rubber Company.

Potdevin Machine Co.

A novel and unique demonstration was provided by the Potdevin Machine Company of Brooklyn, N. Y., which proved one of the greatest attractions of the show. One of the Potdevin Type 248 two-color printing flat and square glassine paper bag machines, was shown in actual operation, and postage stamp bags made thereon directly from a roll of paper were distributed at the rate of 100,000 daily. Pasting, gumming and gluing machinery for edge, strip and solid surface covering of paper, cardboard, cloth and similar materials in sheets, were also operated effectively. Photographs, specifications, samples, etc., of the Potdevin Machine Co.'s paper waxing, envelope, and other paper converting machinery, were also shown.

Armstrong Machine Works

Perhaps the chief attraction of the excellent exhibit of the Armstrong Machine Works, of Three Rivers, Mich., was a glass model of the Armstrong Steam Trap, working under steam pressure, and so connected that the demonstrators were enabled to show the entire cycle of operation, together with the manner in which the Armstrong trap handles air and sediment. Other features of the Armstrong Trap were clearly explained through the operation of this model, which proved of interest to all users of steam traps, and particularly where the use of an individual trap for draining each paper machine dryer was under consideration. A. E. Armstrong, who was in constant attention during the week, was kept busy explaining the application of Armstrong Traps to paper machines, either as individual units, or as adapted to a complete drainage system, and succeeded in convincing many interested visitors.

Union Bag & Paper Corp.

A most comprehensive exhibit—from Forest to Consumer—was provided by the Union Bag and Paper Corporation Associated Companies and Branches, of New York. The Union exhibit was larger and more graphic than last year, and successive stages in the evolution of a Union paper bag were vividly shown. Beginning with a two-foot spruce log, as it comes to the pulp mill, the various stages of converting spruce trees into wrappings and containers were demonstrated, including peeled log, bark useless for making good pulp, chips before being freed of knots and splinters, chips screened and all ready for cooking, wood pulp (mechanical), sulphite and Kraft (sulphate), paper kraft in correct weight and width for purpose, stereotype—used in continuous webb color printing, roll of printed paper ready for the bag machine, waxed lining paper (for the bag is to be duplex), the duplex bag as shipped (that is, deflated), ending with the finished article as it arrives at the counter.

Bachmeier & Co., Inc.

Aniline dyes and lake colors, both, imported and domestic, which are used in bleaching, tinting and coloring all grades and types of paper and allied products, were shown at the booth of Bachmeier & Co., Inc., of New York, which was a riot of colors. The feature of the exhibit was a brightly colored spectrum composed of pieces of dyed silk, which was loaned to Bachmeier & Co., by the owner, William E. Moore, of New York. A complete line of Baco Lake Colors for coated papers and Baco Pulp Colors for all kinds of paper products, also aroused great attention from visitors to the exposition.

Electro Bleaching Gas Co.

A large booth was attractively fitted for the convenience of the friends of the Electro Bleaching Gas Company, of Niagara Falls, New York, pioneer manufacturers of liquid chlorine. Complete information was given to visitors by the courteous representatives of the organization, and instructive booklets were distributed.

William Bond Wheelwright

An up to date and comprehensive advertising display was provided by William Bond Wheelwright, of Boston, Mass. Mr. Wheelwright displayed specimens of advertising originated by him for the District of Columbia Paper Manufacturing Company, Falulah Paper Company, George W. Wheelwright Paper Company, H. Reeve Angel & Company, Albany Felt Company and the Saco-Lowell Shops.

National Aniline & Chemical Co., Inc.

One of the most interesting and artistic exhibits at the Paper Exposition, was provided by the National Aniline & Chemical Company, Inc., of New York. In handsome show cases were displayed pulp, colored effectively by high grade dyes. Dyes for paper, colored pulps, and a wide range of colored paper showing every branch of the paper colorer's art, were attractively displayed. As is generally known, Nacco dyes are made simply—and well. They are easy to use—and satisfying, and are made by an organization of prized prestige, earned through a willingness to work with their clients for the elimination of their dye difficulties.

Foreign Paper Mills, Inc.

Paper testing instruments for diverse uses and in a variety of types were exhibited by the Foreign Paper Mills, Inc., New York. Schopper standard paper testers, capacity testers, hygrometers, folding endurance testers, Schopper strength and stretch testers and desk scales were demonstrated by capable experts and formed exhibits of strong educational appeals.

C. K. Williams Co.

Dry colors for paper makers use consisting of metal oxides, yellow ochres, mineral carbon blacks, umbers, asbestine and fillers were attractively displayed by the C. K. Williams Company, Easton, Pa. This company is the largest manufacturer in the world of dry metal pigment colors for papermakers. The company's booth was in charge of George W. Mitman an efficient expert who has been engaged with the firm during the past thirty-eight years. He was able to demonstrate to papermakers the advantages of metallic oxide colors in paper making by showing the numerous types of paper produced by mills using this company's pigments.

S. K. F. Industries

All manufacturing firms aim at efficiency in machine operations and increased production. Ball-bearing machinery equipments are means for obtaining these ends. S. K. F. ball bearings have established a firm reputation for efficiency and economy of operation. Working models showing the application of these bearings to numerous industrial uses were exhibited in the booth of the S. K. F. industries. The products of this corporation are so well known that a detailed account of the excellency of its numerous products is

unnecessary. Its exhibit this year indicates that its products continue to show the high qualities which have made their use so widespread.

General Electric Co.

A sectional drive for paper mill installations, an electrically operated flow meter, an electric steam generator and other interesting electrical machines were exhibited in the attractive booth of the General Electric Company. An electrically operated G-E flow meter for measuring the flow of steam, air, gas, water, oil and other liquids was a feature of this exhibit which was accorded much favorable comment. This new type of meter consists of a flow nozzle, meter body, and the electrical measuring instruments and voltage regulator mounted on a panel. The meter body is charged with mercury and a transformer so arranged as to form a U-tube, the base or mercury well forming one leg and the transformer chamber the other. A differential pressure produced by the flow nozzle causes the mercury in the meter body to rise around the primary coil of the internal transformer, forming a one-turn mercury secondary. As this mercury ring increases in height more and more current is induced in it, supplied through the primary circuit and measured by the electrical instruments. This is an excellent meter for mill uses. The G. E. Electric Steam generator was another attractive exhibit made by this company. The method of continuously circulating the water in this boiler results in an exceptional evaporative efficiency. This novel type of steam generator is attractive in appearance, clean and simple to operate and install and it is self-contained. It needs no elaborate setting like many other types. This company also showed models of G. E. electric motor drives for beaters and jordans and many other machines and appliances employed in the paper industries. Its booth appeared to be a veritable exhibit of modern electric appliances.

Frederick Iron and Steel Co.

Centrifugal pumps are the most useful of all pump types for mill work. They are simple, efficient, easy to install and operate and take up little space. The Frederick Iron and Steel Company, Frederick, Md., and the Frederick Engineering Company exhibited Frederick Centrifugal Mill pumps of exceptional efficiency. These pumps successfully pump pulp up to a 4 per cent consistency under unusually high heads. The Super-stock pumps handle stocks of high consistency against heads up to 100 feet. Spirex Vacuum pumps and boiler feed pumps were also features of this exhibit.

The Lubrico Co.

The grease makers art is always undergoing improvement. Today paper-mill men are finding that for the lubrication of heavy machinery a high type of grease is the most efficient. Lubriko 7-X grease, made by the Lubrico Company, Philadelphia, Pa., has proved itself capable of rapidly cooling down a hot journal where other lubricants appear to exert little usefulness. It is put up in bricks that are readily cut into convenient pieces for handling and feeding. A good deal of interest was manifested by visitors to this company's booth where samples of the grease bricks were shown.

Southern Kraft Manufacturers

A variety of types of kraft-papers, paper stock, pulp and pulp wood were exhibited by the Southern Kraft Manufacturers. An interesting feature of this exhibit was a new line of beautifully colored and tinted kraft papers.

Greeting Card Association

A beautiful assortment of greeting cards and illuminated designs, association advertising and other picture work was shown in the booth of the Greeting Card Association. Representatives described to visitors the uses to which many of the association's products are being put to.

Mining Equipment Co.

Portable fluid mixers for all types of fluids were shown in operation by the Mining Equipment Company, New York City. These are among the most convenient economical and adaptable mixers made. They are adapted for electrical drives and are serviceable and efficient for many purposes in pulp and paper mills.

Leather Belting Exchange

An educational feature of the exhibition which never failed to draw crowds when it was set in operation was an electrically operated belt testing machine shown in the booth of the Leather Belting Exchange. This valuable device registers the transmission effectiveness and the amount of slip shown by all classes of belts under variable conditions of load and speed. This exhibit was made to indicate to the paper industry the effective research work done by the experts of the Exchange in their laboratory at Cornell University. There were numerous other interesting educational features in this booth including machine transmission belts operating under water.

Mayer Coating Machines Co.

Waxing and oiling machines, asphalt coating and duplexing machines, carton waxing machines and other effective appliances were shown in the booth of the Mayer Coating Machines Company, Rochester, N. Y. This firm has had wide experience in designing, coating and saturating machinery for paper mills and has a research and testing laboratory for handling mill problems for manufacturers. Samples of the products made by this firm's machines were show and proved of wide informative value.

Beck Machine Co.

Sheet cutting machines with a capacity of over a ream a minute were exhibited by the Beck Machinery Company of Philadelphia, Pa. A Standard 36 in. Beck automatic roll sheet cutter installed in an envelope factory had an overtime run of two hours in which it cut 59,000 sheets of kraft paper at the rate of 98 cuts per minute and delivered 588 sheets into the jogger each minute of operation.

Downington Mfg. Co.

A new suction roll, of uncommon efficiency, known as the Kilberry Suction roll, was one of the special features of the fine exhibit of the Downingtown Manufacturing Company, East Downingtown, Pa. The special points of this suction roll are the accurate alignment of the suction box to shell, no wear on the packings, the direct jaw clutch connection to driving shaft without gears and the reduced driving power required. One of these rolls doing heavy duty in a large Canadian paper mill, running with a vacuum of 19 inches gives excellent service without the box ever touching the shell. This is a performance that will be fully appreciated by all who are conversant with the practical operation of suction rolls. Many interesting machines employed in various phases of paper making and plans and drawings of paper mill plants were shown by this well-known company.

Sandusky Foundry & Machine Co.

Splendid examples of drilled shells for Millspaugh suction couch rolls were prominent features of the large exhibit of the Sandusky Foundry and Machine Company, Sandusky, Ohio. Cycloidal Vacuum pumps of a new type now being introduced attracted considerable attention. These pumps are expected to prove of exceptional value to paper mills as they have an efficiency of from 79 to 83 per cent. This is far beyond the efficiency given by older types of pump. These pumps are compact, strongly built and attractive-looking. All parts that come in contact with acids are made from acid resisting chilled iron which has proved superior to bronze. Samples of engraving, rotogravure, marking, press, print and other rolls were shown together with many other products of the Sandusky Foundries.

Purity Paper Vessels Co.

A fine display of paper cans, containers of various shapes, for dairy, confectionery, grocery, soda fountain and other uses was made in the booth of the Purity Paper Vessels Company, Balti-

more, Md. This firm's Pavesco paper milk bottles were shown in several sizes as well as other attractive products of the firm.

A. W. Archer & Co.

The booth of A. W. Archer & Co., New York, was resplendent with color caused by a large exhibit of colored cords, cotton twine, braided cords of various types and cotton ropes. These were all of the highest quality.

Continental Paper & Bag Mills Corp.

One of the most artistic exhibits in the Show was made in the booth of the Continental Paper and Bag Mills Corporation, New York. This important organization operates eight paper mills, six factories and warehouses in the leading cities in the United States. Its products have an international reputation. Its booth contained a wide range of samples of wrapping papers, many of these being colored and highly ornamental, paper bags and sacks, envelopes, tissue papers, paper towels, safety egg cartons and many other of its products.

Farnsworth Co.

The Farnsworth paper drying system was demonstrated in the booth of the Farnsworth Company. An interesting display of pistonless condensation pumps on the Farnsworth principle and Farnsworth boiler feeds was also shown and proved of much value to the visitors.

Electro Bleaching Gas Co.

The booth of the Electro Bleaching Gas Company was furnished for the use of the Company's customers and for demonstrations of the uses of liquid chlorine and other products of the Company's works.

National City Paper Corp.

Representatives of the National City Paper Corporation displayed a large assortment of the various grades of paper, bristol board and other products of its factories.

Oliver Continuous Filter Co.

The economy and efficiency of the well-known Oliver Continuous filter was demonstrated in the company's booth by a model of the latest type of machine. Data was supplied to all who were interested in the use of these well-established machines for brown stock washing in soda and sulphate pulp mills and the thickening of pulp up to any desired density to 30 per cent air dry.

W. Hardy & Sons Co.

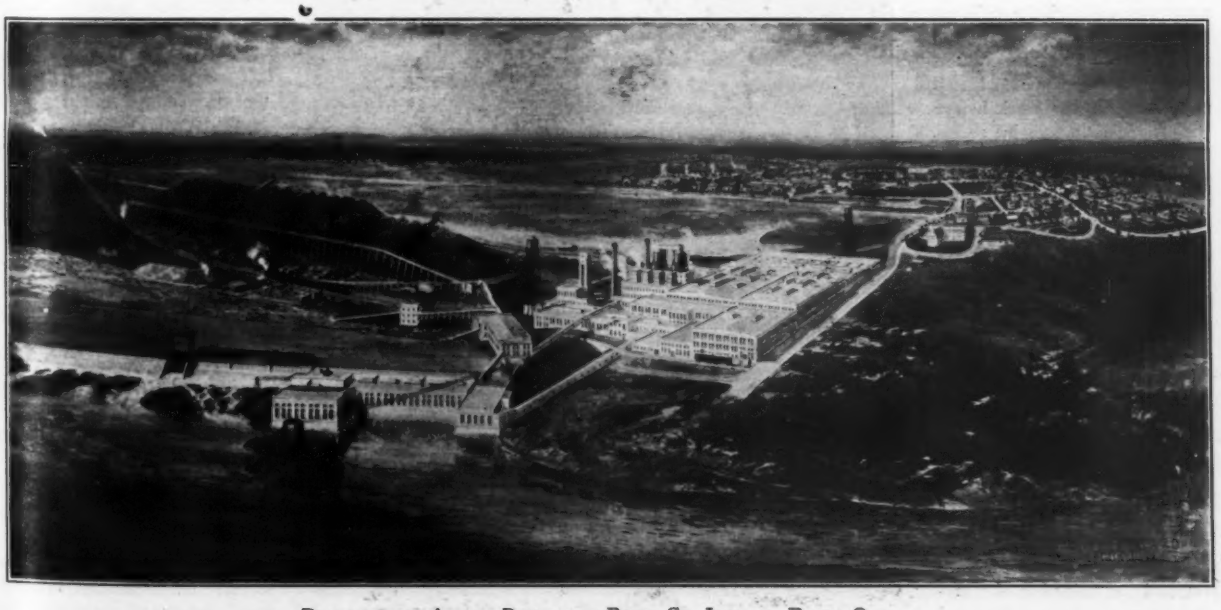
A large line of newly designed bronze blow-off, swing check and globe valves for use in sulphite digester equipments was a feature of the exhibit of Wm. Hardy & Sons. Various types of cast bronze, copper and rolled phosphor bronze screens and screen plates were also shown.

CLAIMS BIG SUM DUE BY LUMBER COMPANY

In the Ontario Legislature recently, Premier Ferguson stated that the former provincial government has claimed that Austin & Nicholson, lumbermen and pulp wood contractors, of Chapleau, owed the province over two million dollars for trespassing and underscaling. The firm was given to understand that the Drury government would reduce this sum to $136,000, and finally was told that settlement would be made for $28,880. This agreement was signed in August last but the new government, coming into office a lear later, found that nothing had been collected. Hon. Beniah Bowman, former Minister of Lands and Forests, said that he thought something had been paid in. Hon. James Lyons, the present Minister of Lands and Forests, said that the mystery was that the two million-odd dollars had been reduced to $28,800. Premier Ferguson stated that Austin & Nicholson would have to pay everything that they should pay. It is understood that Mr. Nicholson, the head of the firm mentioned, will take the matter into the courts.

NIPIGON PLANT OPERATING TO CAPACITY

The Nipigon Fibre & Paper Mills, Nipigon, Ont., which were acquired some time ago by the Nipigon Corporation, Limited, and resumed activity after being shut down for a long while, are running three lines of grinders and operating to capacity. All the equipment was reset and put in good shape. The output of ground wood pulp, which is about seventy tons daily, is consumed both in Canada and the middle western part of the United States. The Nipigon Corporation has purchased all its requirements of pulp wood for the present year locally. The labor situation is the one difficulty, which the company is experiencing at the present time as skilled help is not plentiful in the section around Nipigon.



PLANT OF THE ABITIBI POWER AND PAPER CO., IROQUOIS FALLS, ONT.

TECHNICAL ASSOCIATION MEETS

Ninth Annual Meeting of the Technical Association of the Pulp and Paper Industry Is Held at the Waldorf-Astoria, New York

H. S. Taylor of Dayton, Ohio, is Chosen to Head the Organization for Another Year—Membership Roll Has Been Considerably Increased During the Year and Old and New Members Have Shown a Splendid Spirit of Co-operation—Report of Secretary-Treasurer William G. MacNaughton Show That the Association is on a Substantial Basis—Work of Year Reviewed by the Association Officers.

The ninth annual convention of the Technical Association of the Pulp and Paper Industry was held at the Waldorf-Astoria Hotel, New York, from Monday to Wednesday, inclusive. All the sessions were well attended and the convention was a big success in every respect.

President H. S. Taylor delivered his annual address as follows:

ADDRESS OF PRESIDENT

It is with great pleasure that I greet you at this the opening meeting of the ninth Annual Convention of our Technical Association, and am most pleased to see this meeting so well attended.

The Association during the past year has shown a most healthy progress, our membership rolls have been considerably increased and the new members as well as the old have shown the spirit of co-operation to a very satisfactory degree, and at the same time have given the chairmen of the different committees most commendable support.

The work of an association must, to a great extent, depend upon the work of the different standing committees, and it is to the chairmen of these committees that we must depend upon to bring the work before the Association. There is, therefore, a call on the Association as a whole to work and co-operate in assisting these chairmen and their committees in every possible way.

During the past year new subjects have been investigated by different committees, and further investigation proceeded with on those subjects with which we are already familiar.

Committee On Wood Pulp

With the exception of sulphate process the Committees on Wood Pulp Processes have maintained active interest in the improvements to these processes, both in methods of control and in following the mechanical improvements here and abroad.

H. S. Taylor, President

In ground wood production the use of the freeness test as means of control has become firmly established, and at the present time is in use by practically all progressive groundwood mills. It is recognized, however, that this test needs standardization. During the year the chief advance to be noted for groundwood is the development and application of grinders whereby a continuous grinding pressure is obtained by means of chains in combination with the weight of the wood in the magazine. Grinders of tow designs are in use in a number of plants, operating successfully under widely different conditions.

Under sulphate pulp I regret to say that for the past two years it has not been possible to arrange a Committee on this subject. The recent organization of the Southern Kraft Manufacturers and the co-operative work done by a number of the Middle Western sulphate mills are encouraging signs for this branch of the industry. It is to be hoped that the sulphate pulp committee may soon be revived.

Paper Testing Committee

The signal achievement of the Paper Testing Committee in publishing *Paper Testing Methods* is being emulated by the Committee on Standard Methods of Testing Materials by arranging the approved methods for publication in similar form. These two handbooks with the set of textbooks and a few additional works that are now available will form an extremely valuable library for anyone engaged in the industry. Should our Technical Association have nothing else to its credit except the books I have mentioned, its existence would be amply justified.

Dyestuffs Committee

The work of the Dyestuffs Committee during the year has been the preparation of the section on Coloring in the fourth volume of the textbooks. Those in Cellulose and Coated

and Processed Papers have developed satisfactorily as has the Committee on Paper Drying. This last Committee has shown the results of its active work in the formulation of a Code for Paper Drying. In its present form it is being used by a number of mills, by which the efficiency of the drying may be determined and the results of different mills compared.

The development of a vacuum paper machine drier on a hemicomercial scale by one of our members is worthy of record and its application in the industry will be awaited with interest.

Waste Committee

Since its formation two years ago the Waste Committee has carried out excellent work and reflected much credit on the Association. Besides continuing the work of last year through to completion at this meeting, it has undertaken the investigation of equally important subjects of a different character. The subjects continued are White Water Losses and Their Prevention, the Utilization of Barking Drum Refuse as Fuel, and Broke Losses and Their Reduction, on which concluding reports will be made.

The new subjects which are equally important to the industry are Heat Losses in Pulp and Paper Mills, Mechanical Handling of Materials in Paper Mills, the Utilization of Decayed Pulpwood Resulting from the Attacks of Insects and Fungi, and the only danger is that too much be undertaken at one time. Judging by the work which the Committee did last year, however, and from its progress report at the Fall Meeting it would appear to be able to handle the large volume of work most creditably.

Heat, Light and Power

The Heat, Light and Power Committee is to report progress. In its field one of the mills is reported to have installed a power plant consisting of a boiler operating at materially higher pressure than customary and a steam turbine exhausting at a back pressure of 150 lb. into the regular steam supply, and we hope to hear more about this installation.

Service to Members inaugurated at the beginning of the year has met with considerable success. A number of important problems have been dealt with and the members who have co-operated have thereby been benefited.

Vocational Educational

Under vocational education the work has gone forward with its usual success under the direction of the Committee. With the publication of the fourth volume of the textbooks the large work undertaken five years ago is nearing completion. With the set of textbooks for the industry the next responsibility of the Association will be to secure a wider use not only of the textboks but of the correspondence courses centering about them which have been provided.

During the year the relations between our Association and the PAPER TRADE JOURNAL, in which the Technical Association Section has been published, have been most satisfactory.

Abstracts and Bibliography

The work of the Committee on Abstracts and Bibliography has been a material help. In editing the abstracts and the preparation of the index to the Technical Section, besides preparing a biliography for the year, the Chairman of the Committee is to be highly complimented on the work that he has done.

We have the regular meeting now before us that will bring out I know new subjects of interest, that I trust will prove most enlightening and be enjoyed by all. Let us all grasp the true spirit of such a meeting as ours through the possibility that it provides for, comparing the different problems and view points that each one of us has, and thereby become one and all for the best interests of our Association and the Industry that it serves.

REPORT OF THE SECRETARY

Secretary-Treasurer William G. MacNaughton presented his annual report as follows:

Membership

There has been a satisfactory increase in the membership during the year. The status as of March 31, 1924, being as follows:

Active members	347
Associate members	102
Junior members	90
Corporate members	32
Total	571

In addition there are about 25 applications for membership which are being considered. Satisfactory as the increase has been, a membership of 1,000 is not unreasonable to expect and with that number the Association could do correspondingly more for the industry.

Publication

TECHNICAL SECTION.—The Association's contact with the PAPER TRADE JOURNAL has continued satisfactorily. Through the Technical Section the membership as well as the industry has received much valuable material. In addition to the abstracts of Current Literature compiled by the Committee on Abstracts and Bibliography, there has been published translations of valuable foreign articles as well as many original contributions from members and others.

INDEX.—The preparation of an Index to the Technical section for each six-month period has added greatly to the value of the section for reference purposes. Separate reprints of the Indexes are available at a nominal cost.

PAPER TESTING METHODS.—During the year it was necessary owing to an insistent demand to republish Paper Testing Methods and for it there has been an active sale.

TECHNICAL ASSOCIATION PAPERS VI—1923.—The proceedings of the last annual meeting with some additional material were published in a volume of about 200 pages uniform with previous issues.

THE ACTION OF THE BEATER.—This work which was translated and published by the British Technical Section has been distributed for the United States by the Association. For this there has been a very good demand, over 125 copies having been distributed.

MATERIALS TESTING METHODS.—There is now in the printers' hands a companion handbook to *Paper Testing Methods*, covering the approved methods for testing materials used in the industry which has been prepared by the Committee on Standard Methods of Testing. This work will be sold to members at $2 while the list price is $3 per copy.

Service to Members

Last year a plan was inaugurated for co-operation on manufacturing and technical problems which has met with considerable success. Specific inquiries by members covering their problems are published or distributed to the membership in blank and members are invited to send in replies based on their knowledge and experience. A transcript of the responses also in blank (omitting names and addresses) is made and distributed to those who have contributed toward it. Since the plan was started a few months ago ten problems have been handled in this way. The problems dealt with include:

Substitute of Poplar for Soda Pulp.
Proper relation in width of felt and press rolls.
Causes and remedies for the burning of blowpits in Sulphite mills.
A problem in the distribution of power for costs.
The proper method for storage of pulp.
The interpretation of paper tests.
The sizing of paper in the presence of carbonate of lime.
Cleaning solutions for fourdrinier wire.
The causes and remedies for high sulphur consumption in Sulphite mills.

Casein Substitute

During the year a member suggested the desirability of a co-operative research being undertaken to find a satisfactory substitute for casein in the manufacture of coated paper.

Correspondence developed that while there was practical agreement as to the need for such an investigation and some promise of financial support for it, there was a wide divergence of opinion on the way it should be handled. Some wanted it done in the mill laboratories and others in a commercial laboratory while a few believed it would be best to have it done in the Bureau of Standards where a somewhat similar investigation is being carried on at the present time.

I have suggested that the only satisfactory way to deal with it is for the manufacturers who are interested and ready to finance it to form a committee to have charge of all details with authority to act.

Committee Work

In the co-operative work carried on by the Standing Committee lies the greatest value to a member personally as well as to his company. By concentrating on problems of common interest, each member gets the benefit of the combined effort of the entire committee. More of the members should appreciate the value of acting on the committee and co-operating with them. I would strongly suggest also that each of the committees, as soon as formed, lay a definite plan covering two or three projects and concentrate the work on them.

Materials Testing

The executive committee has under consideration and will probably arrange to join A. S. T. M. so as to be in a position to co-operate in some of the work it is doing. It has been suggested that the Committee on Standard Methods of Testing should be subdivisions of one Materials Testing Committee covering both the materials used and the products of manufacture. If this suggestion met with your approval in a future revision of the handbooks on testing they could be combined and include also the Freeners test of pulp, strength testing as well as tests on papers for special purposes that are being developed. This committee would also logically include in its work the development of specifications for both materials and the products.

Waste and Paper Drying

The Committee on Waste and Paper Drying both have plans for developing co-operative work in the mills in their particular fields. White water losses, as the Waste Committee, points out, in its report, is closely related to the question of stream pollution which is becoming increasingly active in many of the Provincial and State legislatures as well as at Ottawa and Washington. While much of the stream pollution charged to the paper industry is exaggerated it is unquestioned that the prevention of the losses of fiber and other materials in the mill affluent would automatically take care of stream pollution and at the same time be a profitable undertaking for many manufacturers.

It has been of the greatest value to have had the active support and co-operation of the Forest Products Laboratory in this work.

The Committee on Paper Drying in cooperation with a similar committee of the Canadian Technical Section has compiled a Drying code by which it is possible for mills with the ordinary equipment to compare their results on the same basis. It is gratifying to note the interest in this subject by executives, superintendents and plant engineers in the comparison of operating data.

In the manufacture of pulp and paper there are many problems yet unsolved. There are also many of which the solution is well known by some but which are still not applied as a great many mills. It is through co-operation such as that being stimulated through such an Association as ours that the entire industry may be greatly aroused.

In the revision of the Articles of Organization which is presented for ratification, provision is there made for local sections of the Association. It is my expectation that the incoming executives will undertake the establishment of a number of active sections in logical papermaking centers which will be of great benefit to the industry at those points. The Technical Association depends on its members to justify its existence by the work they do and the results they produce. That they have done so is shown by the achievements of the past nine years for each of which there has been something worthy of record.

TECHNICAL ASSOCIATION OFFICERS

The annual election of officers of the Technical Association was held Wednesday afternoon and resulted in a return to office of the officials who have presided over the association's destinies during the past year. The officers re-elected were as follows:

President—Howard S. Taylor, of Dayton, Ohio.

Vice-president—Grelett N. Collins, of the Dill & Collins Company of Philadelphia.

Secretary and Treasurer—W. G. MacNaughton.

Two new members were elected to the Executive Committee for a period of three years. They are L. J. Parant of the St. Croix Paper Company of Woodland, Me., and W. E. B. Baker of the York Haven Paper Company of York Haven, Pa. They succeed George Harvey and George K. Spence.

The other members of the Executive Committee are President Taylor, chairman; E. C. Tucker, of the Chemical Paper Manufacturing Company of Holyoke, Mass.; Royal S. Kellogg, of the News Print Service Bureau, and B. T. McBain, of the Neekoosa-Edwards Paper Company of Port Edwards, Wis.

CHICAGO MARKET FAIRLY STEADY

Book papers were in lighter demand, it is reported by wholesale merchants in Chicago, due to the fact that the printing houses eased up in their takings. It would seem that a good many jobs for spring use were to be finished up by the first of the month and with their completion, requirements for book papers became lessened. However, prices held steady and the market is firm. It is said that mills still have orders ahead and will proceed at the same pace.

Steadiness prevails in the other divisions of the fine paper market. Bonds, ledgers and writings were featureless and continue in regular demand. Prices show no changes.

A general letting-up in demand in the coarse paper market is reported by firms in that branch of the industry. They describe the situation by saying ironically that they are "not overwhelmed with orders." In other words, it requires plenty of digging these days and the organization with an efficient, energetic sales force is the only kind that can keep from branding business as dull. It is noted particularly that industrial buyers are not so actively in the market as heretofore. No changes in prices downward have been noted and it is said that no decreases are looked for. Quotations will hold unless a very dull period comes along and this is not likely. Screenings have firmed up slightly over the past month, a condition that is gratifying to the trade.

The board market has not displayed any signs of further strengthening. It was rather expected that prices would climb about this time, but they have not begun the ascent looked for. Demand is not active; in fact, some sellers complain of a very unsatisfactory situation. Competition for what business there is available is at times rather strenuous, even to the point of shaving quotations to book an order.

Paper stock gave no indications of better conditions, although higher grades continue to hold firm. No. 2 grade of old newspaper, on the other hand, receded $2 per ton, as did also No. 2 mixed papers. No. 1 mixed paper dropped $1 a ton, and binders' clippings declined $2 on the ton. Board mills have not been buying paper stock of late, stating that they have ample supplies to care for the light sale of their own products.

Technical Association Papers and Reports

Presented at the Annual Convention of the Technical Association of the Pulp and Paper Industry at the Waldorf-Astoria, New York, April 8 to 11, 1924—Representative Men in the Pulp and Paper Industry Discuss Numerous Problems of Timely Interest

The Vacuum Paper Machine Drier

By Ogden Minton*

History

In the early days, paper was made by hand. The paper maker dipped a hand mold into paper stock, covered the wire with it, and shook or rocked the wire until the water drained out. He then placed the mold over a felt, pressing it down until the paper stuck to it. This process he repeated many times, until a large number of felts, with paper on them, were accumulated. These were then put in a press for the purpose of removing more of the water from the paper. Some of the water drained off, and some was absorbed by the felts. Lastly, the paper sheets were separated from the felts and hung on poles to dry.

The very highest grade paper can be and still is made in this way, although in very limited quantities, to be sure, because of the high cost of the hand operation.

The first improvement of large importance in the art of paper making is marked by the advent of the fourdrinier paper machine, with which paper makers everywhere today are familiar. Surprising as it may seem, pictures and cuts of the very first fourdrinier type of paper machines show it to have been quite similar to present day paper machines. Some of the very oldest machines had suction boxes, couch rolls, felt presses, and a bank of driers. The author of this article has talked with a veteran paper maker who told him of building and keeping fires going inside the "cans" as he called the drier cylinders. It was not a far step from the fire to steam within the drier cylinders, and the addition of drier felts was a natural development in view of the necessity of passing the paper over a large number of cylinders and of keeping the paper in close contact with them. From the introduction of the fourdrinier machine to this day there has been little change in the process of drying paper. It is true that modern high speed paper machines have many, and large, driers and that they run at high speeds. Moreover, the drying operation has been hastened by blowing large quantities of heated air through the bank of driers to better absorb and carry away the vapor formed, but in principle and in practice it is essentially the same old-fashioned process. While the blowing of heated air through the bank of driers has hastened the drying and allows the machine to be run faster, it has actually lowered the thermal efficiency of the process. This can readily be shown by a heat balance of a paper machine equipped with blowers, hoods, etc., and one not so equipped. The real old machines, strange as it may seem, were more efficient in so far as making use of the heat supplied to them.

By way of improvement of the modern machine, it would appear to be advantageous to raise the temperatures of drier shells to a much higher temperature than is commonly now done, and thereby to dry paper more rapidly and with fewer cylinders. But it is not possible safely to raise the pressure of the steam (and therefore the temperature) much over 50 lb. because of the insufficient strength of the shells. Also paper makers have learned that high temperatures injure the fibers of the paper and that paper dried at a high temperature is not as strong or as good in many ways as when dried at lower temperature.

Seals for Vacuum Paper Machine Drier

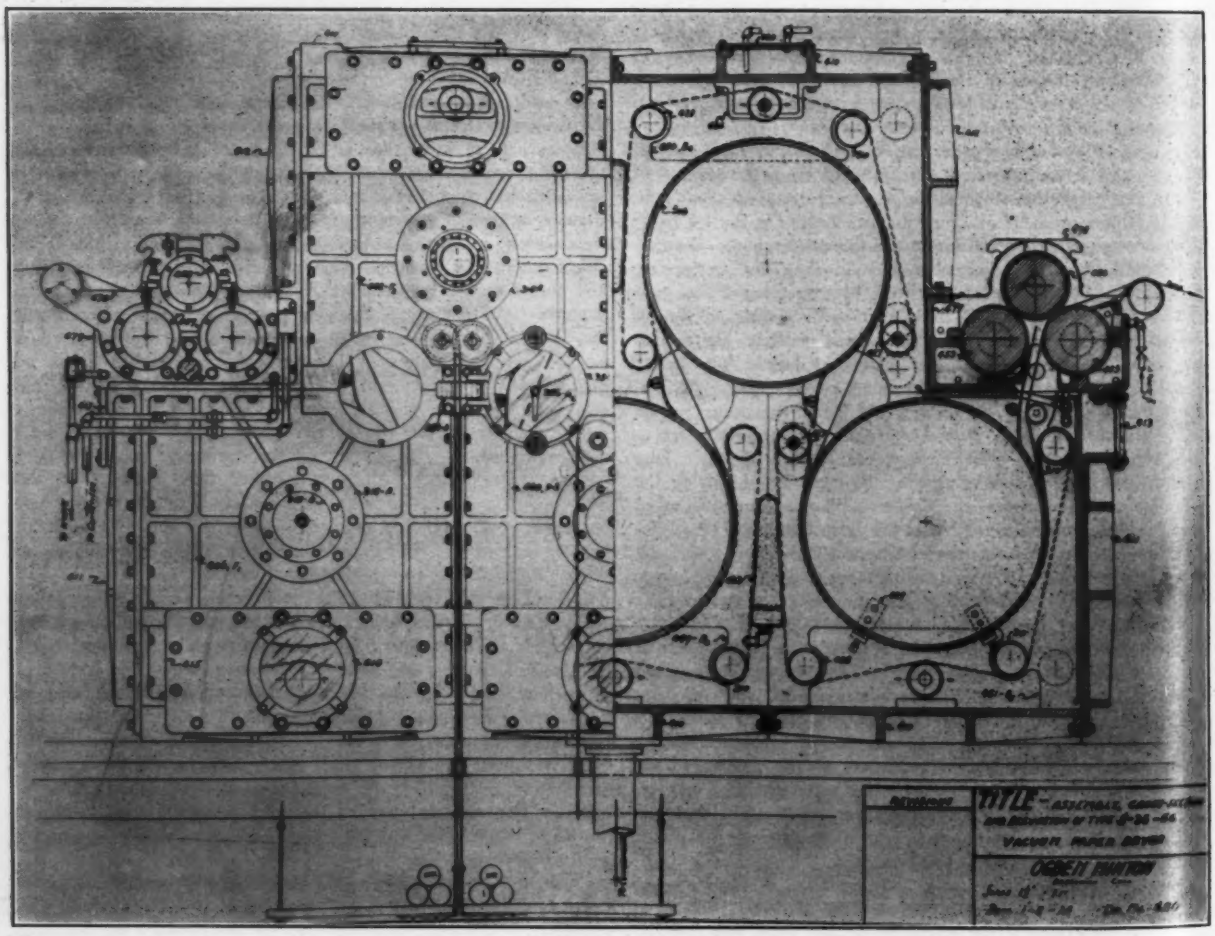
It occurred to the author that some way could be found of drying paper at low temperatures and yet drying it rapidly. The only method he knew was to dry it under a high vacuum. He was familiar with the process of drying sugar in a vacuum and knew also that chemists have for a long time made use of a vacuum when they desired to dry delicate materials without injury. Accordingly he set out to develop a vacuum paper machine drier. The problem soon simmered down to a method of getting paper into and out of a vacuum chamber continuously without breaking the vacuum. The manner of applying heat to the paper after it was once in the vacuum was simple, as present drying equipment could be used for this purpose. The problem then was to devise an ingoing, and outgoing, seal that would allow the paper to pass into, and out of, a vacuum chamber, in which chamber present drying equipment could be placed. Many different forms of seals were experimented with. The first successful seal was a mercury column, through which the paper passed into, and out of, the machine. As far as sealing was concerned, the mercury seal performed perfectly, but mercury was found to be difficult to handle, easy to lose, and expensive. Eventually a seal not having these disadvantages was perfected. Drawings No. 481, 482 and 483, showing this seal, illustrate how simple the latest type has really become. The great problem was to make the seal so efficient as to keep air from entering the vacuum chamber where it would be rapidly expanded and be costly to pump out. The feasibility of packing long rolls like a stuffing box was early abandoned as the friction was found to be too great. This friction could not be relieved by lubrication because the lubricant would cling to the roll and be carried onto the paper. After working with seals of many different kinds, it was learned that to allow water to leak into the vacuum chamber was not at all objectionable since the water was needed for the condenser and eventually had to be supplied anyway. The present type of seal takes advantage of this fact, so instead of allowing air to leak into the vacuum chamber water is allowed to leak in, after which it is led directly to the condenser.

The present seal consists of two bronze covered rolls, with specia-

*Member TAPPI, Greenwich, Conn.

sealing rings at their ends, a rubber covered roll with similar sealing rings at the ends, and a cast iron housing with grooves in which is placed rubber tubing ¼ inch in diameter, with a ¼ inch hole in the center. Water is supplied as a sealing medium and it also acts as a lubricant to the rubber. The two bronze rolls, as shown in the drawings, have one side immersed in water. Some water leaks past the rubber tubes into the vacuum chamber, but because the vacuum holds the rubber tubes tight against the roll and the housing, the quantity that thus leaks past the tubes is very small. The second rubber acts much like a window wiper and wipes the roll dry so that its surface coming in contact with the paper is at all times dry and clean. If the proper kind of rubber is used, water forms almost a perfect lubricant and the friction is so low that it is not an important factor. Results of tests show that rubber, lubricated with water, makes an excellent bearing material. This fact only recently discovered and not yet generally known, we have taken advantage of in designing these seals. In fact one of the large rubber companies has put on the market a bearing of this type for pumps, shafting, etc., which is giving exceptional service. The wear on the rubber tubes is very slight, but provision has been made to replace them quickly when they do wear down. In the machine shown in the photographs the rubbers have not yet had to be replaced and their length of life is therefore not known.

Air cannot leak into the vacuum chamber, because it must displace the water ahead of it which of course it cannot do as long as a constant supply of water is kept in the opening and maintained at the same level. This level is maintained by additional water running in slightly faster than needed, the excess flowing away to waste or to the condenser over a weir. The surface of the rubber roll runs on the two bronze rolls and the vacuum holds it down air tight. The surface of the rubber, however, will give enough to allow the paper to enter or leave the vacuum chamber without allowing air to enter. The pressure of the rubber covered roll on the other rolls can be regulated by means of bearings on the ends of the rubber roll which can be adjusted up and down. Practice has shown, however, that this adjustability is unnecessary as the atmospheric pressure happens to be not too great and the rubber roll does not press sufficiently hard to injure even the most delicate paper. The ingoing seal has somewhat the same effect as a pair of smoothing rolls and if additional pressure were applied to them they would have this effect in increased degree. The seal flattens the ingoing sheet of paper and helps to remove wire or felt marks. The cross section drawing illustrates how the paper passes through the bank of driers and out through the outgoing seal, which latter seal is identical with the ingoing one. The ends of the three sealing rolls are fitted with cast iron rings which run against the side frames and are lubricated. In the case of the two bronze rolls a rubber gasket is mounted behind these iron rings to keep them tight against the side frames. The rubber surface of the rubber covered roll furnishes sufficient pressure to keep the rings at its ends tight against the side frames. This pressure is but slight and

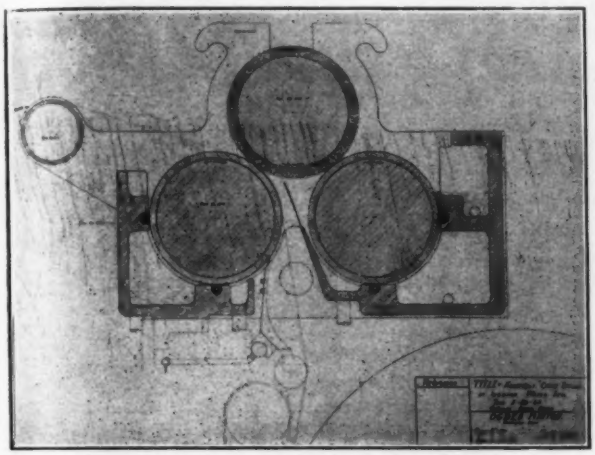


VACUUM PAPER MACHINE DRIER, ASSEMBLY CROSS-SECTION AND ELEVATION

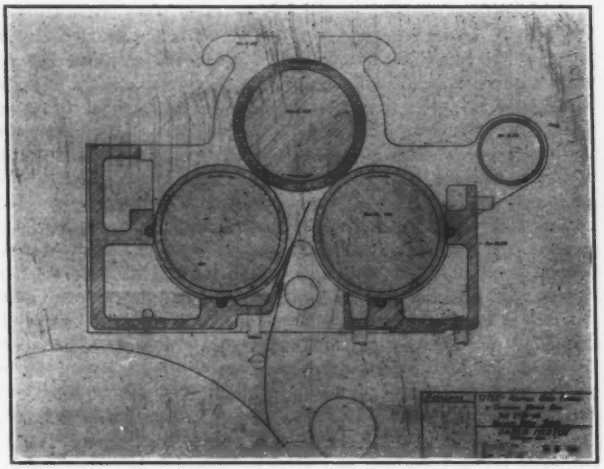
the rings are water cooled by the incoming water. The rings and side frames soon take on a high polish, like a piston ring in a steam engine, and the friction is negligible.

Mechanical Considerations

The accompanying drawings of vacuum paper machine driers show the ingoing and outgoing seals, the cast iron chamber, the series of driers, felts, with felt carrying rolls including hand and automatic take-up rolls and hand and automatic guide rolls. The

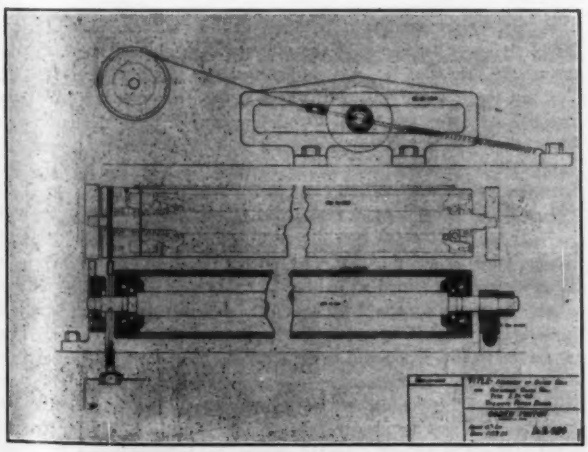


INGOING SEAL—CROSS SECTION.



OUTGOING SEAL—CROSS SECTION

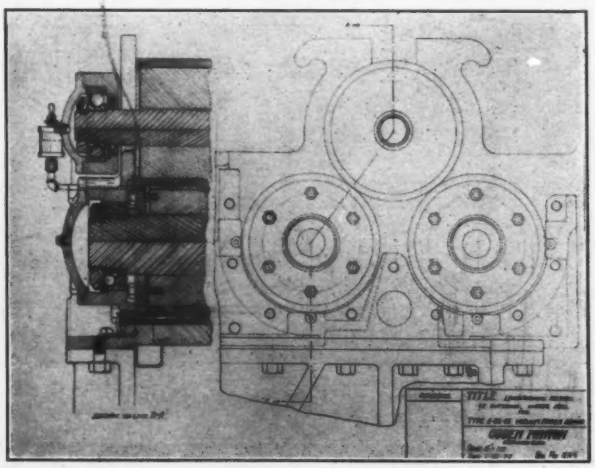
seals have been explained and their construction is clearly shown in the drawings. Ball bearings are fitted on all the sealing rolls. By taking out nine cap screws on each side frame of the seal and eight rubber tube holding plugs the side frames, together with the three sealing rolls, may be lifted off the machine as a single unit, exposing the entire inside of the seal and allowing it to be inspected and cleaned, and the rubbers changed, if necessary. By simply taking off the caps over the ends of the rolls and loosening the nuts over



FELT GUIDE ROLL—LONGITUDINAL SECTION

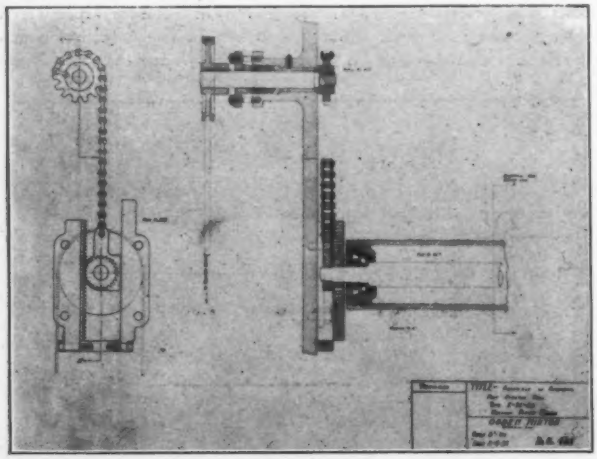
the ball bearings, the side frames can be taken off and the entire seal dismantled, making the rolls readily available for regrinding or recovering should there be need of either.

The cast iron chamber is made in unit construction. A study of the cuts will show that each drier has two side frames, both of which are identical, and one cover plate. If the drier happens to be a top drier the cover acts as a top piece, and if it happens to be a bottom drier the cover acts as a foundation plate. By unbolting one front section, a drier may be slid out the front of the machine for repairs with little more effort than in the present type of machine. Any felt roll can be removed by unbolting the false frame in front and back and sliding the roll out through the opening so formed, an operation quite as easily performed as in the present type of drier unit. The sections of the chamber are made of cast iron, suitably ribbed for strength and stiffness, and have surfaces planed where they bolt together. The sections can all be stacked in a planer and a whole group planed at one setting of the machine. To complete them it is merely necessary to drill the holes for the bolts that fasten the sections together. The surfaces are covered with a coating of thick white lead before bolting together, which has been found to make an air tight joint. When the drier is assembled, a low vacuum is produced on the inside, and the whole machine painted with a special heavy quick drying paint. This paint is forced by atmospheric pressure into any sand holes or imperfections in the castings and dries in the holes, as well as in any imperfection of the joints. It has been found a simple matter to get the cast iron chamber air tight by this method.



OUTGOING SEAL—LONGITUDINAL SECTION

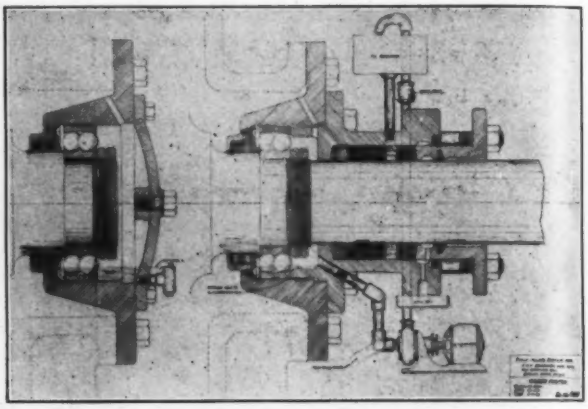
The cut of the assembled drier bearing and stuffing box shows the method of bolting the bearing housing to the side frames. By means of two small jack screws on the front and rear frames, the drier roll may be set absolutely on the correct centers. The ball bearings and housing assembled is then placed and bolted, after which two special dowel pins, with nuts on their ends to facilitate removal, are put in holes drilled through the bearing housing and the front or rear frames as the case may be. These dowel pins insure that the bearing, if taken out after the original assembling, will necessarily go back in exactly the same place and the drier roll will be on its correct center line. This is important not only so that the paper will draw well through the machine, but so that the driving gears will always run on correct centers and the teeth mesh on their true pitch circles, thereby making for long life and quiet running gears with little back lash. All of the main castings are doweled with tapered steel dowel pins to insure that after the machine is received from the shop where built, it will be assembled correctly. The doweling, of course, makes for accuracy of set up equally as well if the machine has to be taken down for any reason after its original installation. Drawing No. 488 of the stuffing box shows an oil pipe leading to an H section bronze ring placed between the different groups of packing. This not only lubricates the stuffing box, adds life to the packing, and cuts down the loss due to friction, but it also insures that there will be no air leaks. The oil pressure is slightly greater than atmospheric pressure because of the head of oil from the tank to the bearing, which is sufficient to cause oil to force back the atmosphere, and leak outwardly as well as inwardly. The oil that leaks inwardly lubricates the ball bearing, and when it reaches a certain height it flows off through the overflow pipe to a small pump, which pumps it back to the original tank. There is a check valve in this line to prevent air leaking back. The quantity that leaks outwardly has been found to be very small. It can be run to a small pump and pumped back, if desired, or it can be collected in a drip pan, which has been found entirely satisfactory. This construction



Automatic Felt Stretch Roll

insures a total absence of air leak around the stuffing boxes and affords perfect lubrication.

The cut of the ball bearing housing shows the ball bearings being held in place on the rear of the machine so that there is no end play. The bearing on the front of the machine is not so held. This allows the drier shell to expand and push the front ball bearing back or forward in cooling off and in heating up. This expansion in a very wide machine is considerable and in the very widest machines provision is made for the front bearing to slide very easily in the housing by other means than shown in this cut. The ball bearing races are ground out slightly larger than standard bearings to allow for expansion due to heat. The expansion and contraction of the main cast iron chamber and the seals is almost uniform, as the temperature difference between these parts is never great. With a 28 in. vacuum this temperature is only 100 deg. F and therefore no special provision has to be made to take care of expansion. Also, since this temperature is constant all over the machine, no trouble is experienced from joints working and consequent leaks. The rubber gaskets on the ends of the sealing rolls



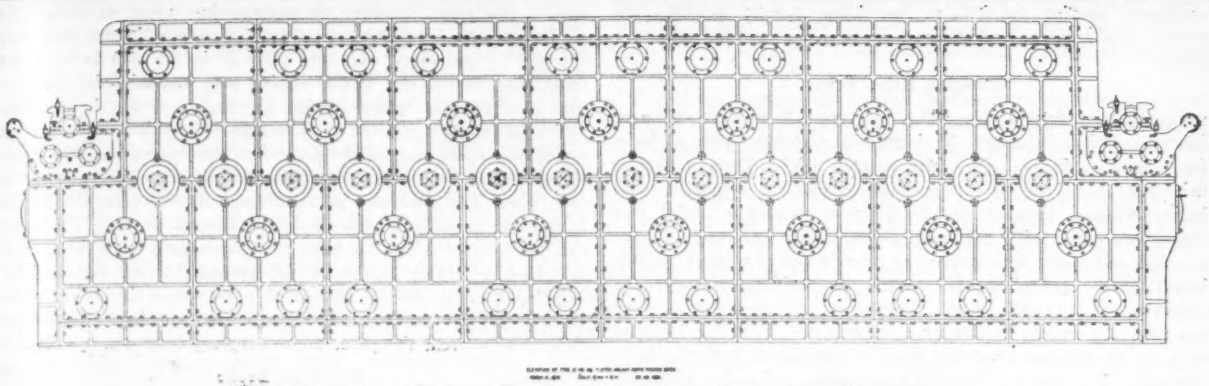
Oiling System for Ball Bearings and Seal for Stuffing Box

compensate for any expansion or contraction of these members. The expansion and contraction of the felt carrying rolls is taken care of in the same manner as the drier rolls, but on a smaller scale, as the temperature of these rolls is never very high.

All driers, felt carrying rolls, and seal rolls, are balanced statically and dynamically so that vibration is eliminated. The cast iron chamber being in box form, and bolted together, makes an ideal mounting for rolls. As the chamber is also heavy, it affords an excellent foundation, with the result, that this type of drier can be run at speeds greatly in excess of any drier heretofore built, and with less vibration.

As the entire machine is enclosed in the cast iron chamber it is necessary to be certain that the automatic guide roll operates with certainty. Drawing No. 484 shows how this has been accomplished. The automatic guide roll consists of a shell mounted on ball bearings fixed on a stationary shaft. This shaft is pivoted at one end; the other end which is mounted on a small ball bearing, moves forward and backward, the bearing running on a guide. The guide actuating roll has a stationary shaft on which the shell is mounted and on the front end there is a separate piece, also mounted on ball bearings. This is made to pull the guide roll by means of a small bronze cable, when the felt runs up on this part. A spring pulls the guide roll backward when the actuating roll is not pulling it forward. Because of the ball bearings and this special design, the guide is very sensitive and holds the felt within close limits. Due to the fact that, when the drier felts are not properly made, they sometimes tend to run off one way, or the other, and get to a point beyond the control of the automatic guide, a hand guide has been included in the design, the design of this is similar to the automatic guide except that the automatic feature is not included.

Drawing No. 485 of the automatic stretch roll shows clearly how this operates. The operating shaft is taken out through a stuffing box in the side frame. A steel cable goes down under the floor to which weights are suspended to obtain any desired tension in the felts. There are two of these weight suspension devices, one on each end of the automatic stretch roll. The shaft on which the roll is mounted has a gear on each end which meshes with a rack attached to the inside of the machine, thereby insuring that the



ELEVATION OF VACUUM DRIER FOR 230-IN. HIGH SPEED NEWS MACHINE

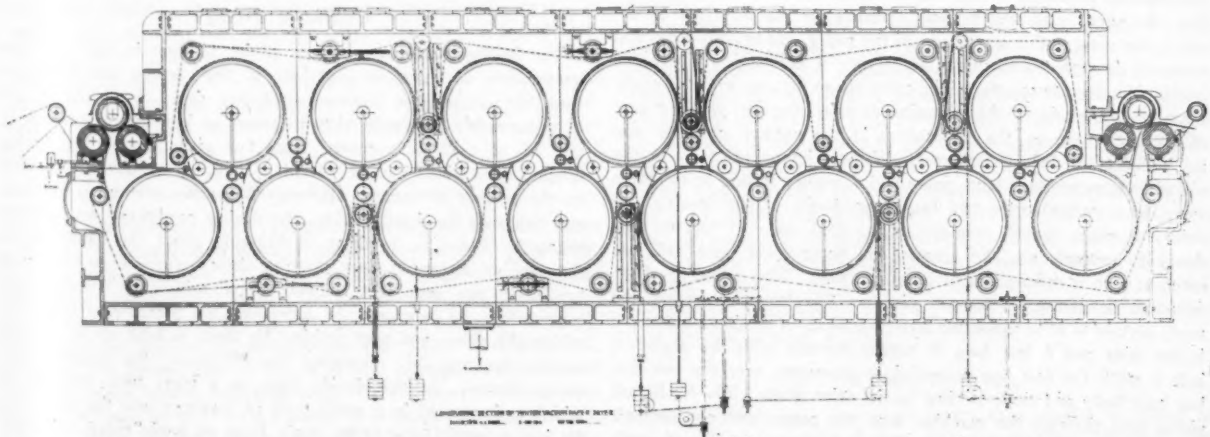
stretch roll will move up or down and at the same time remain level and in line at all times, with little or no torsion on the stationary shaft on which the shell is mounted. The hand takeups for the felts are similar in construction to the automatic, and are of sufficient capacity to take care of all the stretch that may occur in the felt. These hand takeups have the tension weight on the back side of the machine but on the front side they are designed for manual operation, being made use of only when the automatic takeup has traveled its range and the felt is still too loose.

All of the bearing housings are fitted with alemite grease gun fittings which makes the filling of bearings with grease a simple, clean operation. This need only be done once or twice a month. The waste of lubricant is reduced to a minimum. All of the bearings and housings have been so designed that it is a simple and quick operation to take out a bearing and insert a new one should occasion demand. Extra bearings may be carried in stock and loss of time from a possible bearing failure should be slight. It has been possible, all through the machine, to use oversize bearings. Their life, therefore, should be extremely long and many times that of the normal size and type of bearing.

Because of the unit construction of the machine, the following standards have been adopted to facilitate manufacture and to attain better proportions and machine design advantages. For machines up to 90 in. wide, a 36 in. diameter drier is used; for machines from 90 to 160 in. wide, a 48 in. diameter drier is used; and for all machines over 160 in. a 60 in. diameter drier is used. Designs have been made, and stress and strain diagrams, and weights figures, for a machine 240 inches wide. The total weight of the complete vacuum paper machine drier is slightly less than that of the present standard type of drier of the same capacity. Of course, the vacuum paper machine drier unit has comparatively fewer drying cylinders. The amount of machine work is also slightly less than in the case of the present type of drier. The cost of erection, and the time required for this work, is about the same as for a present standard drier section with possibly a slight advantage in favor of the vacuum type. No hood is required nor does the roof of the machine room require special construction, for the vapors are all taken to the condenser. Offsetting these economies, it is necessary to have a condenser and a dry vacuum pump, both of which are standard equipment and require little attention, being placed in the cellar under the machine.

Felt Driers

Felt driers of the cell type were installed for a time in the test machine for experimental purposes. Experience has shown that they are unnecessary. Vapor leaving the sheet of paper and passing into the felt remains vapor and passes on through the felt to the vacuum chamber. It can not condense to water, for to do so it must give up its latent heat, which is impossible since the temperature of the surrounding vapor, of the felts, and of this vapor is exactly the same unless there is a difference of temperature there can be no exchange of heat units. The only useful function felt driers could possibly perform would be to warm up the felt and conduct heat units to the paper. But felts are poor conductors of heat and have capacity to absorb little heat from the felt driers for transmittal to the paper. This is a very different phenomenon than that which occurs in the present standard type of paper machine drier, where the vapor from the sheet passes into the felt and



LONGITUDINAL SECTION OF VACUUM DRIER FOR 230-IN. HIGH SPEED NEWS MACHINE SHOWING SINGLE TOP AND BOTTOM DRIER FELTS

condenses, causing the felts to run damp, thereby retarding the drying, and making it necessary to equip the machine with felt driers.

Changing Drier Felts

Cross section drawing No. 480 of the type 5-36-66 Vacuum Paper Machine Drier (5 driers, 36 inches in diameter, with a 66-in. face) shows individual drier felts on each drier. These individual drier felts were put on this machine so that the cylinders could be compensated (run at slightly different speeds) in order that high grade paper might be dried without being stretched. To accomplish this result each succeeding drier is run at a speed slightly less than the preceding one. With this adjustment paper the equivalent of loft-dried paper is produced. When individual felts are used, the endless woolen type is preferred. The felt-carrying rolls are so designed that they may be removed through the front windows. It is not a difficult task to replace a felt, but it seldom has to be done. The life of woolen drier felts in this type of machine is extremely long, because of the low temperature to which they are exposed, to the slow speed, to the ball bearing rolls which relieve the drag, and to the fact that they never get wet. Cross section drawing No. 491, of the larger drier section type 15-48-120, shows simply one upper and one lower felt, since this machine, being designed as a book-machine, is not compensated. From this latter machine, felt driers have been eliminated, for reasons explained heretofore. The felts on Type 15-48-120 may be changed in the same manner as in the present type paper machines, except that the door shown at the end of the vacuum type of machine must first be opened. This door may be opened in less than 5 minutes time and replaced in another 5 minutes on even a large machine. In other words there is a delay of only 10 minutes over present methods which delay is but a small proportion of the total time in changing a drier felt on a wide machine. It should be remembered that, because of the reduced number of driers, the felt is much shorter—less than half as long—and the loss of 10 minutes mentioned above is more than offset by the time saved in unreeling the new felt and reeling up the old felt. The felts on a vacuum paper machine drier, however, would not have to be changed so often, as explained. Thus in the long run there is a large saving in felt changing time instead of a loss as might be supposed.

Passing Paper

When the first vacuum paper machine drier was being designed apprehension was felt that passing the paper through the machine might present much difficulty. Accordingly, specially designed, complicated steam doctors were included in the original design. These worked splendidly. But when the machine was first started up, someone neglected to turn the steam into the doctors. Nevertheless, the paper was seen to pass through the machine just as desired. As soon as this was observed the paper was broken down and repassed through the machine. Each time it automatically threaded itself. Needless to say the complicated steam doctors were promptly removed. A study of this situation revealed the fact that, because of the high vacuum, the atmosphere in the vacuum chamber was not sufficient to deflect the paper. Without intending to do so, the old physics experiment of a penny and a feather falling at the same speed in a vacuum tube had been reproduced. Upon leaving one drier the paper travels straight to the next one. It has no tendency to crumple up. Of course, the paper must have sufficient speed to give it momentum to jump the pass. This speed has been found to be about 200 ft. per minute. The faster it travels, the more certain is it to make the pass. A piece of cardboard about 9 inches wide and 4 feet long is passed through with the paper, to help it make the first few passes, since the paper, near the wet end, has little body and tends to cling to the drier shells. The cardboard pieces pass through the machine with the paper, and out through the outgoing seal and may be used over and over again. If cardboard does not happen to be available any dry piece of paper, folded over a few times, answers the purpose just about as well. The cardboard strips, however, serve another purpose in that they fold the end of the paper over and place it in the bite between the rubber and bronze roll of the ingoing seal, and minimize the danger of a machine tender getting his fingers caught in this bite, which has made it possible to place a guard at this point to prevent accidents. After starting the paper into the ingoing seal, the paper threads itself through the machine and out through the outgoing seal, where it is taken and passed through the calender, size tub, or to the reel, as the case may be, in any manner desired. The worst that can happen is for the paper to miss a pass, in which case it falls back and is carried by the felt around the next bottom drier, skipping the top drier. In this case the paper is broken down at the entrance and repassed through the machine. Doctors on each drier prevent the paper from wrapping around a cylinder.

Removing Broke

The vacuum paper machine drier is fitted with doors, in each of which there is a glass window. These doors can be quickly opened and are so located that they are directly in front of the pass. A little study of the drawings will show that when these doors are opened a space is provided through which the paper may be speared off in case of failure of a drier doctor or the snapping off of the paper resulting in its wrapping around a drier, just as it is now done on standard paper machine. These doors give just about the same size opening as there is between the front frames on a standard paper machine drier and broke may be removed in the same manner as at present. Paper however, never breaks on a drier section till it becomes partly dry. It has much elasticity when wet, so that it will stretch rather than break. But in the vacuum paper machine drier, after the paper has become slightly dry it will pass of its own accord. To demonstrate this fact, the author went to a good deal of trouble to make a device to break paper inside the drier. But because of delicate control all through the machine, a break is a rare occurrency in a vacuum paper machine drier.

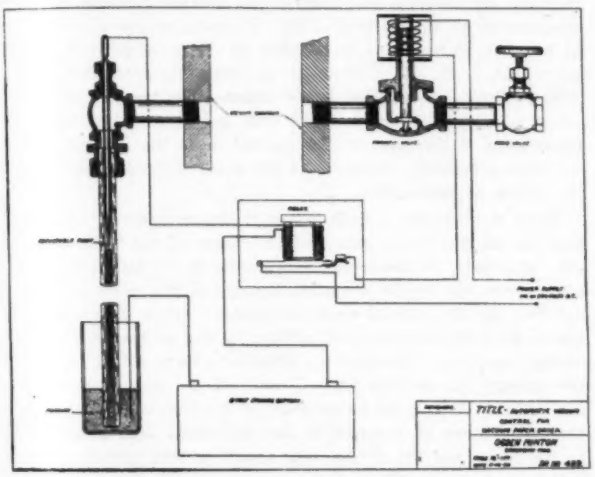
Process of Drying Visible

The inside of the vacuum paper machine drier is fitted with electric lights, making the entire inside of the machine visible. The several doors with glass windows, allow the process of drying to be watched. The vapor coming off the paper is a true vapor. There is no fog to obstruct the vision and to a stranger to the vacuum process it looks as though there is no drying going on. The paper, when passing through the machine, may be watched. It is an interesting sight to see it, automatically and of its own accord, pass from drier to drier and finally out through the outgoing seal to the atmosphere.

Control of Drying

The boiling point of water at 28 in. vacuum is 100° F. The temperature of paper on the drier in the vacuum can never exceed 100° F. until it becomes absolutely dry. For water cannot exist, as water, but must turn to vapor at any temperature above 100° F. at a 28 in. vacuum. This fact gives a very low drying temperature, which can be varied at will, up or down, depending on the amount of vacuum applied. When the vacuum is changed, and this may be done quickly, the drying conditions are instantly changed. There is no delay in bringing about the change as in the case of standard paper machine driers where changed drying conditions are dependent entirely upon raising or lowering the temperature, by increasing or decreasing the pressure of the steam within the driers and then waiting for them to heat up or cool off, as the case may be. Drawing No. 489 shows the automatic vacuum control. In this device there is a glass tube, one end of which is immersed in a small tank of mercury and the other end fits into a special pipe fitting made from an angle valve. One end of the angle valve fitting is connected, by a pipe, to the vacuum

chamber. There is a small steel rod, with a needle point on the end, going down into the glass tube. The valve stem packing gland packs this against air leaks, but allows the needle to be raised, or lowered, in the glass tube. As the vacuum increases the mercury rises in the tube until it comes in contact with the needle, which makes an electrical contact through a relay and battery (as shown) and a wire from the battery into the mercury. This relay in turn operates a solenoid controlled valve, allowing air to leak into the vacuum chamber, thus preventing the vacuum from increasing further. The solenoid controlled valve has another valve attached to it, which can be operated by hand in case of failure of the solenoid, and also to regulate the size of opening for the air to leak into the vacuum chamber. This device can be made to control the vacuum within 0.002 inches. By raising or lowering the rod with the needle point in the glass column, any amount of vacuum may be selected and maintained automatically and thereby control the rate of drying as previously explained. This rod may be operated by a device which operates directly from the wetness or



AUTOMATIC CONTROL FOR VACUUM

dryness of the paper, in which case the control is entirely automatic. This last feature is not shown in the drawing.

Theoretical Considerations

Until very recently the actual phenomenon that takes place in the process of drying paper has not been thoroughly understood. It was at first assumed that the wet paper was always heated to a temperature of 212° F. before the water would boil out of the paper and be absorbed and carried away by the air. In the case of many of the very old machines this was very nearly what took place. However, of the more modern machines this is not true for reasons presently to be explained.

Concerning Evaporating Temperature

The assumption that the evaporating temperature of water from the paper at atmospheric pressure cannot be over 212° F., is true, because of the fact that 212° F. is the boiling point of water at this pressure. Water cannot exist as water, but will turn to vapor at any temperature over 212° F., at atmospheric pressure. If sufficient heat be applied to water in an open vessel at atmospheric pressure, the temperature of the water will increase until it reaches 212° F., when boiling will take place. The temperature will then remain constant at 212° F. no matter how much additional heat is applied. The rate of evaporation will increase, but not the temperature. It is not true, however that the evaporating temperature must always be the boiling point (212° F.) for it can be lower. In fact, in paper drying methods as employed today, it is usually lower. The evaporating temperature depends entirely on the vapor pressure.

One of the fundamental laws of thermodynamics covers this point thoroughly and has been stated as follows: Vaporization from the surface of a liquid above which is the gas of another substance does not take place under the pressure of that gas, but under the pressure of any vapor of the evaporating liquid which may be present and be mixed with the gas. Thus water in a vessel open at the top will evaporate or vaporize in the same way and with the same absorption of heat and in the same quantity if it be exposed to still air or other similar gas, or be exposed to a space devoid of air or other gas. The pressure under which evaporation takes place is that of the water vapor in the space above the liquid, and if there happens to be air in the space the phenomenon of evaporation is not altered. For very exact physical work this statement must be modified to take account of certain variations introduced by very minute molecular attraction between different gases and vapors, but for the most exact engineering work the law may be stated: Evaporation from the surface of a liquid in contact with a gas or gases with which the liquid or its vapor does not react chemically is independent of the presence of that gas.

Finding Heat Values

Since the evaporation of the liquid takes place under pressure of that liquid, the latent heat of vaporization and similar quantities must correspond to that pressure. Such heat values can easily be found for any case when a vapor table for that particular substance is at hand, because, although it is generally difficult to measure the vapor pressures, they must correspond to the temperature of the space above the liquid. The vapor in that particular space must be saturated, because if superheated it would lose heat to the liquid as previously described. If saturated, its pressure must correspond to its temperature, and knowing the latter the former can be found from the vapor tables. Thus, water with its surface exposed to air at a temperature of t° F. will evaporate until the space above it contains as much water as it is capable of holding at that temperature; that is until the volume occupied by unit weight of the vapor corresponds to the value given in the vapor tables. The water vapor must have the same temperature as the air with which it is mixed, and must have the pressure corresponding to that temperature and also contain all heat in quantities corresponding to that temperature. To find the heat necessary to cause evaporation of one pound under such conditions, the temperature of the space above the liquid must be found in the steam tables. The corresponding heat of vaporization will be the value sought.

The modern type of paper machine (i.e., the machine most commonly used, no attempt being made to include the loft drying process and other similar processes less commonly used) is covered with a hood that fits closely around the drier section and is connected with the roof by a tight-fitting duct. Blowers or exhausters are installed in the system to force large quantities of air, sometimes preheated, through the drier section.

The very old type of paper machine was not equipped with means of passing air through the drier sections. Vapor coming from the paper on the drier rolls of the old type was very close to 212° F., but in the modern type this temperature is considerably lowered. Recent tests of modern paper machines show that this temperature is as low as 175° F., which means evaporation must take place at this or a lower temperature.

The Rate of Drying

In considering the drying of paper, care should be taken not to confuse the rate of drying with the thermal efficiency. The rate of drying will depend on the difference between the temperature

of the steam inside the drier and the evaporating temperature of the water in the paper, assuming that the thickness of drier shells, the material of which they are made as well as their smoothness inside and outside, the oil film, and the quality and tension of felts, are the same in any two cases compared. And the evaporating temperature depends on the rapidity with which the water vapor is taken away when it forms. This water vapor may be taken away by means of air currents as in the modern machine described, or by drying the paper in a vacuum chamber in which case the vapor goes to the condenser. The results of either method can be made identical. Thus if the evaporating temperature is lowered to 175° F. the rate of drying will correspond to drying under a vacuum of approximately 15.75 inches of mercury.

Of course, to lower the evaporating temperature to 175° F. in the modern machine, it is necessary to pass a very large quantity of air through the drier section to absorb the water vapor. Air is only capable of absorbing a small amount of water vapor before it becomes saturated. In actual practice the air cannot be charged to even nearly 100 per cent saturation or condensation will take place as it leaves the drier section. This large quantity of air, in passing through the drier section, is heated and discharged through the ventilating system. Thus much heat is wasted in the modern method of drying paper.

Thermal Efficiency

The thermal efficiency of drying under the method using air for the discharge of vapor, falls off in some indefinite ratio to the quantity of air used. Just what this ratio is, cannot be told at the present time with the data now available. Recent tests of paper machines where the rate of drying is rapid show very low thermal efficiencies.

Consider this from another angle. To evaporate a certain amount of moisture a certain number of B.t.u.s must be applied. First the water in the paper must be raised to the temperature of evaporation, and sensible heat to this amount must be added. Then latent heat to change the heated water from water to vapor must be added. (The quantity can readily be calculated from the steam tables when the temperature of evaporation is known.) The quantity of heat that will pass through a drier shell, all other things being equal, varies directly as the difference between the temperature inside and outside of the drier. Thus when the temperature of evaporation is lowered a greater temperature difference would be expected, and hence a greater transfer of heat from the steam through the drier shell with consequent more rapid drying. This is exactly what takes place. At the same time many heat units pass to the air that are only needed to keep it from becoming saturated before it is taken out of the machine room. In other words the method of removing the water vapor by means of air currents is wasteful of heat and the thermal efficiency of this method must be low. As mentioned above recent tests have fully demonstrated this fact.

Because of the delicacy of wet paper and the speed with which it passes through the drier section, it is extremely difficult to get accurate temperatures of the water vapor leaving the sheet of paper. In fact this temperature varies. While the paper is in contact with the surface of one drier it is at one temperature and while passing from one drier to the other its temperature must change at least slightly. Various methods of taking such temperatures have been devised but there is reason to doubt their accuracy. For instance, it is not sufficient to take the temperature of the outside of the drier shell as the temperature of evaporation. Moreover taking the temperature of the outside of the drier shell is difficult and even when this temperature is taken by means of thermocouples there is reason to doubt the accuracy. However, sufficiently accurate readings have been taken to demonstrate the method of drying paper outlined above and actual tests of the whole drying unit confirm this theory very closely.

Seeking Reliable Data

Much data is being collected by skilled engineers who have recently given this subject a great deal of thought and eventually reliable data will be obtained. The difficulties are great, however, and after the data is all at hand it is going to be quite a task to make assumptions from this data as to just what takes place. Such questions as, "What happens to the sheet of paper while passing from drier to drier?" will have to be answered. Does water actually evaporate in the pass? If it does evaporate it must get its latent heat from somewhere to do so. Where does it get? The temperature of the various driers increases as we approach the dry end. How then shall we get an average figure of evaporation? Many such questions can be asked and in the present state of the art it is quite impossible to answer these questions entirely satisfactorily.

Some difficulty has been encountered in explaining the phenomenon of evaporation at temperatures under 212° F., but the following helps to an understanding. Under a vacuum of 28 inches of mercury for example, the steam tables indicate the temperature of evaporation to be practically 100° F. and the quantity of water in 1 cu. ft. of vapor to be 0.002851 lb. The humidity table indicates that 1 cu. ft. of free air at atmospheric pressure will at 100° F. hold just 0.002851 lb. of water. The two are equal. In other words the vapor pressure (the weight of water vapor per cubic foot) is the same in the vacuum as in the free air, and, as we have previously shown, it is the vapor pressure that controls the drying or evaporation.

There is obviously a limit to which the temperature of evaporation can be lowered by means of absorption of the water vapor by air. Moreover, the lower this temperature is, the less economy will result from the drying operation because of the large quantity of air that absorbs heat as explained above. Again the entering air has to be sufficiently hot and sufficiently dry to be efficient in absorbing moisture. The ideal condition of course would be to have the entering air entirely free of moisture but this of course cannot be had. Also if the temperature of the entering air were above the temperature of evaporation the air would then give heat up to the paper and the drying rate would be still further increased but the economy would again be lessened, since a large quantity of heat would be absorbed in raising the temperature of the air.

Purposely, no attempt has been made to give actual figures in the above discussion. We feel that such figures in the present state of the art are not available with anywhere near the degree of accuracy necessary for mathematical calculations. It is felt that the drying of paper is a much more complicated process than heretofore considered and that much work is still to be done before accurate data will be available. Moreover, weather conditions that vary from day to day, have a marked influence on the rate of drying and effect thermal efficiency. No two days are exactly alike.

Vacuum Paper Machine Drier

Drying paper in a vacuum is a simpler process than drying as practiced today, in consequence of which much more accurate data can be obtained. In a vacuum, the temperature of evaporation must be the temperature corresponding to the vapor pressure which is the amount of vacuum. Theoretically we have a saturated vapor surrounding the paper at the temperature and the pressure of the vacuum being used. Knowing the vacuum the temperature can be found from the steam tables. If the vacuum is 28 in. of mercury, the temperature of evaporation will be approximately 100° F. and the rate of evaporation will be directly proportional to the difference between the temperature of the steam in the drier and the temperature of evaporation, all the factors being considered equal, such as condition and tension of drier felt, thickness of drier shell, oil or grease film on inside of drier, and surface of outside and inside of drier shell.

As to Vacuum Drying

In vacuum drying, the rate of drying and the thermal efficiency are absolutely independent of weather conditions since the paper is not dried in the presence of air but in a vacuum and at a temperature which is maintained constant regardless of the outside temperature or humidity. Winter or summer, and dampness or dryness of weather, are not factors in vacuum drying. As the wet paper enters the vacuum paper machine drier it comes in contact with a heated drier and sensible heat is passed to the water in the paper thus raising its temperature to the evaporating temperature corresponding to the amount of vacuum being carried. The amount of sensible heat is small and in most cases the paper will reach the evaporating temperature before leaving the first or second drier. From this point on, the rate of evaporation will be constant on all driers. The paper in making the pass from one drier to the next will neither take on nor give off heat units, because the temperature of the vapor surrounding the paper in the pass will be the same as the temperature of evaporation. (The curve is shown in Fig. 1.)

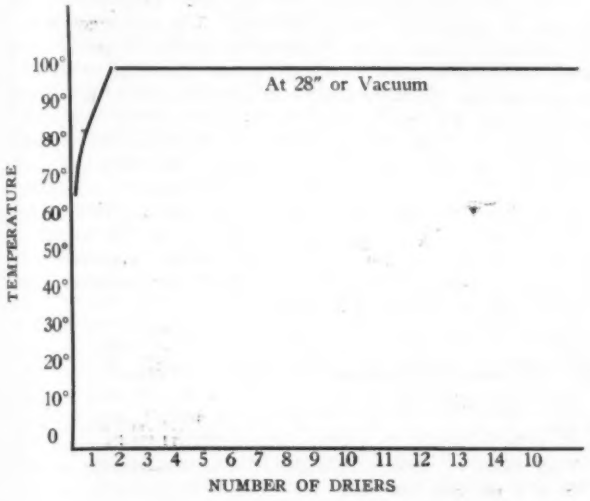


FIG. 1

With the vacuum machine it is possible to very precisely regulate the rate and amount of drying because not only the steam pressure within the drier, but the amount of vacuum, can readily be changed. By increasing or decreasing the amount of vacuum the drying conditions are instantly changed and no delay is encountered in waiting for the drier shells to cool off or heat up as is the case in the present type of paper machine driers. By means of a simple but effective device, the amount of vacuum can be automatically regulated to within 2/1000 of an inch. It is feasible to connect this control with another device whereby the moisture content of the paper leaving the drier will regulate the vacuum. Thus the papermaker may be relieved forever of the uncertainty of how wet or how dry his paper is going into the reel, absolute uniformity of moisture being assured. This makes for a considerable saving as the news papermaker can leave just 10 per cent of moisture in his paper and get paid for it. As it is now the papermaker dries his paper something below 10 per cent as a margin of safety because of the fact that he cannot control his moisture per cent very close since his drying is dependent upon weather conditions and since his control of drying temperature is limited to his control of the steam pressure which control has a very considerable lag.

Thermal Efficiency High

The thermal efficiency of vacuum drying must necessarily be high, almost 100 per cent. The driers being enclosed in a high vacuum (which acts similar to a thermos bottle) only give up heat to the paper which is in contact with them—no air is present to absorb and carry away heat units. If for instance a vacuum of 28 inches of mercury is carried the drying temperature or temperature of evaporation will be about 100° F. and the vapor given off will be at this same temperature. The vacuum case will therefore be at this temperature. If, as occasionally happens on a hot day in summer, the temperature of the air in the machine room should be over 100° F. the vacuum drier case would actually take a small amount of heat from the atmosphere of the room and the machine would be apparently over 100 per cent efficient.

The only heat loss in the operation of a vacuum paper machine drier will be the radiation of heat from the cast iron case in which the driers are enclosed. The temperature of this case (when 28 in. vacuum is carried) will not be over 100° F. and with a machine room temperature of 75° F. the slight difference of 25° F. in temperature will cause little loss of heat. This loss may be further minimized by the application of a coating of 85 per cent magnesia insulation over the case of the machine.

Again, when using a vacuum of 28 in. the water going to the hot well of the condenser will be at approximately 90° F. and this warm water is available for use in the beaters or in the flow box of the paper machine instead of ice cold water which some of the northern mills have to use in winter. Practically all the heat units expended in the process of drying are thus brought back in this warm water. If this warm water all be use, the cost of heat for drying can be called zero.

A plan has been worked out whereby the white water from the machine or the saveall is used for condensing water which, in condensing the vapors from the paper machine drier, is heated up and then returned to the beaters or the paper machine, or elsewhere as needed, thus returning all of the heat expended in drying the paper.

Making Calculations

Considerable emphasis above has been put upon the fact that the rate of drying depends on the difference between the temperature of the steam inside the drier and the evaporating temperature of the water in the paper. In calculating the size and number of drier rolls this fact is important. If, in designing a new paper machine, the moisture content of the paper and the rate of evaporation of the moisture be known, the number and size of driers necessary can very readily be calculated. Also the theoretical number of heat units necessary to complete the drying process can be determined. In theory these figures, applicable to the vacuum process, can be arrived at with a good deal of accuracy but allowance must be made for such factors as the smoothness of the drier surface, quality, thickness and tension of felts, thickness and material of drier shells, and surface of inside and outside of drier. These factors, however, are the same as are met with in atmospheric drying. Table No. 1 gives an approximate idea of the extent to which the rate of drying determines the size of the drying unit necessary. In this table, for sake of comparison, a steam pressure of 5.3 lb. gage pressure inside of the drier has been assumed for all cases, 5.3 lb. being an average steam pressure used in actual practice today. In varying this pressure it is interesting to note the effect upon the rate of drying.

This shows the extent of control a papermaker has over his rate of drying with the present standard paper machines. It is also interesting to change the figures given in this table on line No. 2 and calculate the additional control of drying that can be had with a vacuum paper machine drier. These figures can be found in the steam table opposite any amount of vacuum that may be carried in the vacuum chamber; and it should be remembered that with the vacuum paper machine drier and papermaker can select any vacuum within reasonable limits and have it automatically maintained constant for him as previously described.

Heat Units Decrease

Another significant fact to be noted from table No. 1 is that the total number of heat units (line No. 7) to dry the paper decreases as the temperature of evaporation (line No. 2) is reduced. True this is not any very great amount but nevertheless it is a real saving of heat units and thus of coal. Because of the negligible heat losses in the vacuum paper machine drier the total heat units shown in line No. 7 table No. 1 very nearly represent the total heat required to evaporate 1 lb. of water under any given condition of vacuum. As previously explained, this is not true in the present day paper machine because in order to lower the temperature of evaporation the paper maker must pass a very large quantity of air through the bank of driers. This air absorbs heat units and the heat units so absorbed represent the loss in thermal efficiency. By accelerating the rate of drying through the introduction of additional quantities of air to lower temperature of evaporation a direct falling off in thermal efficiency results. This is unfortunate because except for this one fact there is a decided advantage to be gained by reducing this evaporating temperature.

It is conceded by almost all modern papermakers that a low drying temperature improves the quality of the paper in strength, degree of sizing, brightness of colors or tints and the ability of paper to age without turning a brown faded color when exposed to light for any long period of time. When paper is dried in a vacuum paper machine drier under a vacuum of 28 in. of mercury the paper can never reac . a temperature over 100° F., which temperature is no greater than the temperature of some of the hot days of summer. The fibers of paper dried at this temperature are not scorched or burned. The low drying temperature will not turn the size in the paper to starch or fade delicate colors or tints. It is impossible with the data now available to say just how much stronger or better paper will be when dried at this low temperature, but in some cases the added strength and quality undoubtedly will be considerable. This is particularly true of paper made of the cheaper grades of stock such as groundwood. Thus the papermaker can use cheaper stock and make the same or a better quality of paper.

Number of Driers Required

The number and size of driers necessary to a drying machine in part depends upon the percentage of water to be evaporated from the paper. In referring to this percentage, 70 per cent wet shall be taken to mean that the wet contains 70 per cent water and 30 per cent of bone dry stock. Table No. 2 has been prepared to show the quantity of water necessary to be evaporated to produce one pound of paper both bone dry and 8 per cent wet. (Some papermakers work upon a bone dry stock basis and some upon an 8 per cent wet stock basis.) Incidentally it may be pointed out that this table shows the importance of having the wet presses perform properly. There is a certain percentage of wetness of stock that is most economical, considering cost of press felts against cost of steam, but this is a percentage that each papermaker must determine for his own particular paper machine in the light of cost of felts and cost of steam.

TABLE No. 2

Wet water %	Bone dry stock %	Water evaporated per lb bone dry paper lb	Water evaporated per lb 8% wet stock lb
75	25	3	2.68
74	26	2.85	2.55
73	27	2.70	2.404
72	28	2.57	2.294
71	29	2.45	2.174
70	30	2.33	2.07
69	31	2.23	1.972
68	32	2.12	1.871
67	33	2.03	1.788
66	34	1.94	1.7
65	35	1.86	1.625
64	36	1.78	1.556
63	37	1.70	1.484
62	38	1.63	1.422
61	39	1.56	1.36
60	40	1.50	1.30

From tests, the papermaker can determine the percentage of wetness of paper stock going to the drier. This percentage known, the amount of water to be evaporated to produce 8 per cent wet paper can be determined from table No. 2. For illustration let it be assumed that the paper stock is at a temperature of 65° F. and is 69 per cent wet (nearly an average for news print). Table No. 2 indicates that 1.972 lb. of water is to be evaporated for each pound of 8 per cent wet paper to be made under these conditions. Table No. 1, line No. 2, indicates the temperature of evaporation and line No. 7 the total number of B. t. u. necessary to evaporate 1 lb. of water. This latter figure multiplied by the number of pounds of water gives the total B. t. u. necessary to produce 1 lb. of paper. Assuming the paper to be dried in a vacuum paper machine, the calculation is as follows:

Temperature of wet stock..... 65°
Vacuum ..... 28 in. Hg.
Temperature of evaporation..... 100° F.
Total B.t.u. necessary to evaporate 1 lb. of water..... 1070.6

Then from table No. 2

Wetness ..... 69 per cent
Water to be evaporated..... 1.976 lb.

Then $1070.6 \times 1.976 = 2,116.50$ B. t. u. necessary to produce 1 lb. of 8 per cent wet paper.

The negligible amount of sensible heat necessary to raise the actual paper stock from 65° F. to 100° F. has been purposely disregarded.

Each pound of steam at 5.3 lb. pressure contains 960.0 B. t. u. of latent heat which is given up to drying paper.

Then $\frac{2116.50}{960.0} = 2.203$ lb. of steam at 5.3 lb., which is necessary

TABLE NO. 1

No.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Steam pressure in drier (lb. per sq. in. gage)..	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3
1.	Steam temp. in drier (° F.)	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228
2.	Temp. of evaporation of water in paper (° F.).	212	201.96	193.22	182.86	176.85	170.06	162.28	153.01	141.52	126.15	101.83	100	90	80	70
3.	Difference of temp. = 1-2 (° F.)	16	26.04	34.78	45.14	51.15	57.94	65.72	74.99	86.48	101.85	126.17	128	138	148	158
4.	Ratio (first difference considered at unit)....	Unit	1.63	2.17	2.82	3.19	3.63	4.11	4.66	5.34	6.34	7.89	8	8.61	9.25	9.89
5.	B.t.u. sensible heat to raise 1 lb. water from 65° F. to temp. of evaporation (2-65° F.).	147	136.96	128.22	117.86	111.85	105.06	97.28	88.01	76.52	61.15	36.83	35	25	15	5
6.	B.t.u. latent heat which has to be added to 1 lb. water to change same to vapor	970.4	976.60	982.0	988.2	991.8	995.8	1,000.3	1,005.7	1,012.3	1,021	1,034	1,035.6	1,041.2	1,046.7	1,052.3
7.	Total B.t.u. (= (5)-(6)) necessary for evaporation	1,117.4	1.113.56	1,110.22	1,106.06	1,103.65	1,100.86	1,097.58	1,093.71	1,088.35	1,082.15	1,070.83	1,070.6	1,066.2	1,061.7	1,057.3
8.	Corresponding vacuum (in. of Hg.)	0	5.49	9.56	13.63	15.67	17.70	19.74	21.78	23.81	25.85	27.88	28	28.50	28.89	29.18

to produce 1 lb. of 8 per cent wet paper with 100 per cent thermal efficiency.

Some Mill Data

A vacuum paper machine drier will very nearly attain the results indicated by these calculations. One of the best known, best managed, and most modern news print mills in Canada is understood to use 3.25 lb. of steam per pound of paper. Its steam costs $0.65 per 1,000 lb. The mill in question makes 100,000 tons of newspaper per year. This data affords the basis for an interesting calculation:

Steam used per lb. of paper.....3.25 lb.
If dried in a vacuum paper machine drier, steam used per lb. of paper.....2.203 lb. theoretical
Say.....2.25 lb. actual
Saving of steam per lb. of paper.....1.00 lb.

$$\frac{100{,}000 \times 2{,}000 \text{ lb. steam} = 200{,}000{,}000 \text{ lb. of steam}}{\frac{200{,}000{,}000}{1{,}000}} \times \$0.65 = \$130{,}000 \text{ per year saving in steam alone}$$

The vacuum paper machine drier has other great advantages. Being entirely enclosed none of the moisture from the drying process is set free in the machine room, but is conducted by a pipe to a condenser and condensed. This obviates the necessity for an expensive ventilating system. The machine room, even in summer, need not be hot and the air may be but normal in moisture. As a result, present day working conditions can be greatly improved. Also from a study of "ratios" Table 1, line 4, it will be seen that a vacuum paper machine drier operating under 28 in. vacuum (column 12) required only one-eighth the number of driers required by a standard paper machine as indicated in column 1. Ratio of number of driers can be figured for any other cases desired. We have yet to find a case where the same amount of paper could not be dried on one-half the number of driers now being used. This means that the drier section of the paper machine will be never over one-half its present length and in some cases much shorter, and have the same drying capacity. This will save a great amount of floor space, and in cases where the production of paper is limited by drying capacity, as is often the case, will allow of materially increased paper production without enlarging mill space. Also, the reduction in number of driers means that the distance from the wet end to the dry end will be greatly reduced, making it easier for the machine tenders to operate the machine.

Some papermakers claim that the engine driving the paper machine provides sufficient exhaust steam for drying their paper and it is unnecessary to use live steam for drying. This may be true, but with the vacuum drier they can install a more economical engine, of less power and yielding less exhaust steam, with very substantial savings.

Condensing the vapors from the vacuum paper machine drier present no new or difficult problems. The equipment is identical with that used for condensing exhaust steam from any engine or turbine, and this is standard. Most paper mills have an abundant supply of water and, when this is true, an educator type of condenser can be used, through which it is merely necessary to pass cold water. This type of condenser can be made to eject a considerable amount of air, sufficient in most cases to offset any leaks in the drier and piping, without necessitating a dry vacuum pump. The type of condenser most suitable will depend on local conditions such as the availability of water, the head for inlet water, and the level at which the hot-well can conveniently be placed. The cost of condensers is small, they are simple in construction, and they require little attention to keep them running successfully. Contrary to the general opinion, a full vacuum (28 in. mercury) can be quickly obtained. The present Minton vacuum drier consistently obtains this vacuum in less than 3 minutes. This time interval will be entirely dependent on the type and size of condenser and vacuum pump installed.

Any type of device for removal of water from driers such as buckets, siphons, etc., as well as any system of traps for drips and any system of steam inlet to driers, may be used exactly as on present machines. Existing driers can be used, and as a rule only slight alterations are necessary to adopt them for use in vacuum paper machine driers.

Practical Considerations

It is an interesting calculation to show the amount of water vapor that has to be absorbed and carried away by means of air from a machine room equipped with two large high speed news machines. Assume a case, and there are such, of a machine room with two machines capable of making 100 tons of paper on each machine every 24 hours. Assume also that the paper going to the driers of these machines is 70 per cent wet, which is a fair figure. Then for every pound of paper made there is (from table No. 2) 2.07 lbs. of water evaporated.

100 tons $\times$ 2,000 lb. $\times$ 2.07 = 414,000 lb. of water evaporated per 24 hours, and for the two machines there would be 828,000 lb. of water evaporated per 24 hours. It is no wonder that an elaborate ventilating system is necessary to take care of this amount of moisture, and it is not surprising that heat losses are so great when considered from this standpoint. The vacuum paper machine drier will evaporate this moisture at almost 100 per cent thermal efficiency and then return practically all of the heat used for evaporation, in the form of water at 90° F., for use in the beaters and flowbox, which in the winter time in a northern mill is an important item.

Savings

In estimating the saving in steam that will be brought about by changing from a standard drier section to a vacuum paper machine drier, each individual case has to be considered on its own merits. Some drier sections are much more efficient than others. In some cases the cost of steam is much less than in others. The per cent of saving of steam per pound of paper made is, of course, more attractive to the mill making the cheaper grades of paper. For if the vacuum paper machine drier saves a certain amount of money per ton and the price per ton is low, the saving is relatively large, whereas if the price per ton be high the saving in steam would appear of relatively less importance. On any low priced paper such as news, board of various kinds, or pulp the saving in steam alone can be shown to make it profitable for the papermaker to replace his present drier with a vacuum paper machine drier. Take for example a news machine making 100 tons of paper per day. We have:

100 tons per day $\times$ 300 days = 30,000 tons per year.

30,000 tons $\times$ 2,000 lb. = 60,000,000 lb. of paper per year.

We have shown previously that the saving is 1 lb. of steam per pound of paper made, and when an average is taken the year around, including winter weather, this figure is very conservative. If steam costs 60 cents per 1,000 lb., which is an average figure for northern mills, we have:

$$\frac{60{,}000{,}000}{1{,}000} \times .60 = \$36{,}000,$$ saving per year in cost of steam. This is the interest at 6 per cent on $600,000. An estimate of the cost of a vacuum paper machine drier for a machine of this type would be under $100,000, showing a considerable saving. Add to this the saving due to the fact that all of the heat units used in drying the paper are returned in the water at 90° in the hot-well for use in the beaters and the flowbox, which in winter are needed and must be supplied, and the saving in steam per pound of paper would be more nearly 3 lb. than 1 lb. On a year-round average it can be shown that the saving in steam would average close to 2.5 lb., making the saving figure $90,000, instead of $36,000 as shown. In this case the vacuum paper machine drier would pay for itself in one year. To the above savings there must be added the savings in cost of felts, lubrication, floor space occupied, and the improved quality of paper. This last item will be considerable. More groundwood may be used in the furnish and less sulphite

pulp and the same strength paper made. Still there is to be taken account of savings due to lowered power, and surely the improved working conditions are an item of considerable value, as in some instances the vacuum paper machine may be operated with fewer men.

The above facts show beyond doubt that the papermaker will profit considerably by replacing his present drying equipment with a vacuum paper machine drier.

It should be noted here that when the vacuum paper machine drier is installed in a mill, the heating of the machine room in winter is no different from heating any other room. In many of the tests of paper machine driers that have been carefully studied it has been noted that the steam used to heat the machine room had not been charged against drying the paper. It should be. The results of these tests as far as thermal efficiency go would show a considerably lower efficiency were this taken into account.

In the case of the papermaker making medium priced papers, similar savings and economies can be shown, but the improved quality of paper he can make with a vacuum paper machine drier is of even greater consideration. By using a cheaper furnish he can produce paper of equal quality and even larger savings realized.

In the case of the papermaker making the very high grade papers, especially loft dried papers, reduced costs are tremendous. By taking paper direct from the wet press and drying it in a compensated vacuum paper machine drier at 28 in. vacuum and a temperature of 100° F., then tub sizing the paper and redrying in a sceond vacuum paper machine drier, paper the equivalent of loft dried paper, including the cockle (if desired) can be made in reels and the high cost of loft drying and sheet calendering avoided. Remember that this paper is dried originally and also the second time at a temperature of 100° F., which is lower than the loft drying temperature, and the paper is dried without being stretched.

Calculations will show that a Yankee drier of comparatively small diameter will have a tremendous drying capacity and therefore high speed and also high thermal efficiency.

The savings in cost of drier felts is an appreciable item. As explained before, the felts are less than half the usual length, temperature to which they are subjected is low, and as there is very little drag on them because of the fact that the felt carrying rolls are all mounted on ball bearings. As a result they have long life.

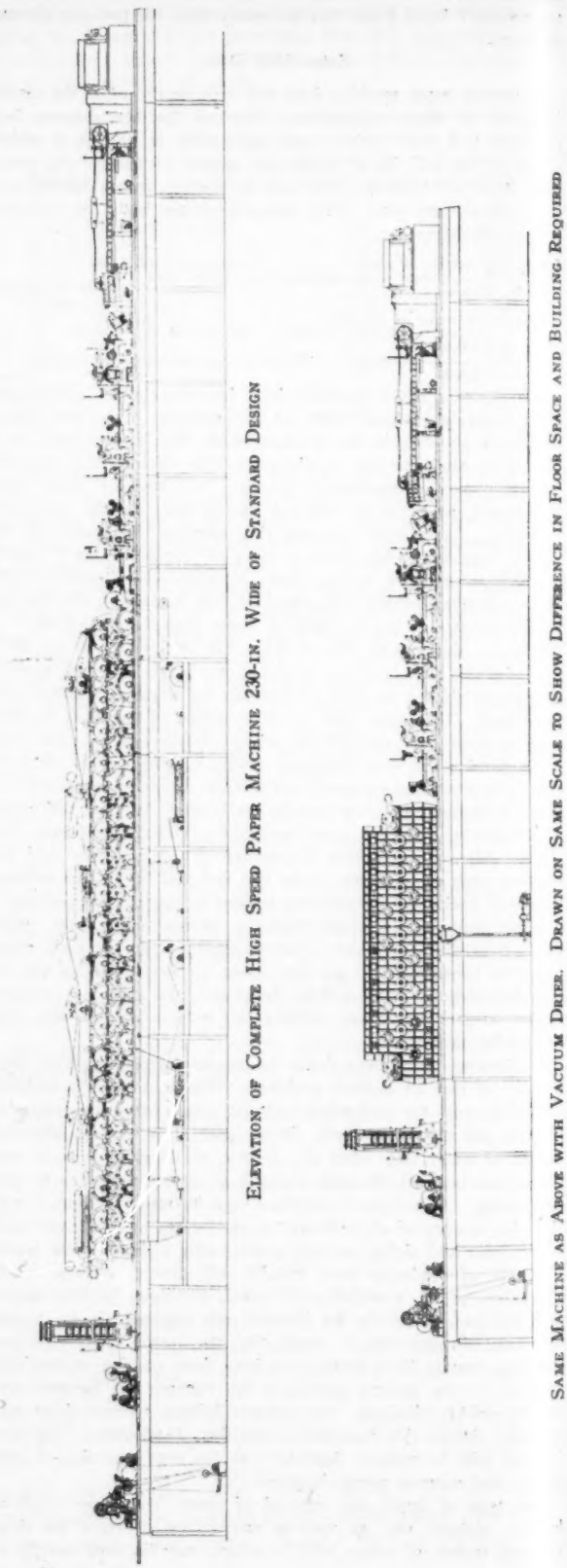
Working Conditions

In the opinion of the author one of the best features of the vacuum paper machine drier is that the machine room will be free from the moisture and heat and the machine so shortened that working conditions will be very greatly improved. The distance from the last wet press to the calender or reel will seem ridiculously short. Drawing No. 492 shows the comparison of a 230 in. news machine, with standard driers, and with a vacuum paper machine drier. This particular machine has a comparatively low temperature of evaporation and the vacuum paper machine drier is longer and contains more driers than ordinarily would be the case. Many machine rooms of which the author knows are very oppressive places in which to work on a hot day in summer. The humidity is just about 100 per cent and the temperature very high.

Conclusions

It has been shown above that the cost of a vacuum paper machine drier is less than a standard paper machine drier of equal capacity, and that the savings in steam, felts and floor space are great, which, together with improved working conditions and a better product, mark this method of drying paper as a revolutionary improvement in the art of paper making, second only to the advent of the fourdrinier paper machine. It is a process which will rapidly come into general use.

In closing, the author would like to add that the results obtained have come about after six years of intensive work on his own part and those associated with him. The development work



ELEVATION OF COMPLETE HIGH SPEED PAPER MACHINE 230-IN. WIDE OF STANDARD DESIGN

SAME MACHINE AS ABOVE WITH VACUUM DRIER. DRAWN ON SAME SCALE TO SHOW DIFFERENCE IN FLOOR SPACE AND BUILDING REQUIRED

was of a pioneer nature. Data had to be collected as the work proceeded. Much of this data could not be found in text books, and was obtained only after a great deal of original research. Experiments were carefully and scientifically carried out and the results tabulated. All of this required considerable time and a lot of patience and perseverance. The machine design called for careful study as the pressure due to the atmosphere is high and stress and strain diagrams had to be carefully made of all parts. These calculations have been proved and demonstrated as correct in the drier which has been built and subjected to the most rigid tests. The cost of this work has been large. Many models were made and two full size driers were built, torn down, and rebuilt several times, before the present perfected commercial type was evolved. An attempt was made, with only partial success, however, to keep the work being done from receiving publicity until the perfected drier was ready to demonstrate its possibilities in a commercial manner.

Much credit is due to the loyal support the author has received from those associated with him in this work, who have given their time and energy in helping to solve problems as they arose. These associates are Geo. W. Dodge, formerly of the American Writing Paper Company and later chief engineer of the Brampton Pulp and Paper Company of Canada; J. S. Babbitt, formerly in the chemistry research department of the Barrett Company; F. M. Sanger, formerly test engineer of the Westinghouse Company and later superintendent of the Norwalk Iron Works. The author is the inventor of this process and machine for drying paper which has been thoroughly covered by applications for patents in the United States and all of the principal paper-making countries in the world.

Report of the Committee on Abstracts and Bibliography

By C. J. West, Chairman

The Chairman of the Committee regrets that he must again report that the work of the combined Committee on Abstracts and Bibliography has been confined almost entirely to routine matters during the year 1923. Much of the time of the Chairman has been occupied in the completion of the translation of Heuser's text-book on Cellulose Chemistry (which has been prepared with the aid of Dr. G. J. Esselen, Jr., Chairman of the Cellulose Section of the American Chemical Society), and also in the preparation of a bibliography of bibliographies on chemistry and chemical technology, a compilation which will include about 7,500 references to bibliographies, and which, it is hoped, will be of some interest to the paper industry, inasmuch as it contains, among other things, references to practically all of the bibliographies on papermaking.

Abstracts

Through the able assistance of the abstractors for the Technical Section (John L. Parsons, A. Papineau-Couture, M. L. Caust and Paul Bartholow) it is felt that the literature of the papermaking industry has been thoroughly covered, and that abstracts of value have been supplied to the industry. The Chairman has endeavored to classify these abstracts in such a way as to make them accessible, and believes that their value has been further increased by the preparation of a semi-annual index of the Technical Section. During the year 1923, the published abstracts totalled 76,178 words, which corresponds to approximately 900 inches, or about 45 printed pages. The Chairman desires to emphasize that the credit for this work should be given entirely to the abstractors.

Bibliographies

During the year, 1923, five bibliographies were published, as follows:

No. 37. American and Foreign Paper Trade Periodicals. Frederick C. Clark and Clarence J. West. PAPER TRADE JOURNAL, 76, No. 4, 45-49 (Jan. 25, 1923). A revision of contribution No. 3.

No. 38. Paper research literature, VII. Revised. A list of contributions by members of the Bureau of Standards, Department of Commerce, 1910 to Dec. 31, 1922. F. A. Curtis and C. J. West. A revision of Contribution No. 18. PAPER TRADE JOURNAL, 76, No 6, 47-52 (Feb. 8, 1923).

No. 39. Electricity in Pulp and Paper Mills. A reading list. Clarence J. West. PAPER TRADE JOURNAL, 76, No. 8, 5053 (Feb. 22, 1923).

No. 40. Bibliography of Papermaking for 1922. Clarence J. West and A. Papineau-Couture, PAPER TRADE JOURNAL, 76, No. 16 to 26 (1923).

Paper Research Literature

No. 41. Paper Research Literature. I. Contributions by Members of the Forest Products Laboratory. PAPER TRADE JOURNAL, 77, 46-50 (Aug. 16, 1923).

In addition to these bibliographs, a bibliography on beating appeared in connection with that section of Volume IV of the text-books.

Complete Bibliography

The Chairman has continued in a small way his efforts to prepare a complete bibliography of paper making. All of the references from Chemical Abstracts have been carded, as well as those from the Journal of the Society of Chemical Industry. It is hoped during the coming year that much of the work on this project can be completed. This will involve a page by page search of the papermaking magazines. It is felt that this search need not cover those periodicals issued before 1900, because most of the important work has appeared since that time.

Requests

The usual number of requests for bibliographies, photostatic copies of printed material, and loans of current magazines have been received by the chairman. In most cases, the information has been furnished, although in a few cases answers could not be supplied. It is to be hoped that this phase of the committee's work may increase in volume, because it is the best indication of the value of the committee's activities to the industry in general.

Definitions of Paper Terms

Your chairman has also served as chairman of the sub-committee on Definitions of the General Committee on Standardization of Paper Sizes of the Bureau of Standards, and with the able assistance of F. A. Curtis, prepared and published some definitions of some eight hundred paper terms. While it is realized that these definitions are preliminary in nature, they at least furnish a basis for discussion and constructive criticism.

INCREASED CAPACITY FOR PAPER CO.

Through the installation of additional machinery the Pennsylvania Paper Products Company, Green Lane and Smicky street, Philadelphia, now is equipped to manufacture and label new sizes of paper cannisters with metal tops and bottoms for the transportation and packing of grease and dry products. A new Burt labeling machine provides for the printing of 180 labels per minute.

The Cooking of Sulphite Cellulose

Comparative Data of Results in Production Efficiency and Economy, of Different Methods of Cooking Sulphite Cellulose in Different Countries.

By G. P. Genberg*

(Some comparative data of results, production, efficiency and economy, of different methods of cooking sulphite cellulose in different countries.)

The scope of this paper is an endeavor to throw some light on the always active questions, which country produces the best pulp and which method of cooking gives the best results. It is an old story that two mills can never make the same kind of pulp, and it is often heard around mills that different digesters yield different pulp. The more the "rule of thumb" methods are replaced by definite control and the more knowledge we gain of the fundamentals of the process, the sooner will this be proved to be only a delusion.

In this paper a comparison of the different methods of making sulphite pulp, with a discussion of their differences and their bearing on the quality of the product, the relative efficiency of the methods and their economy. The material used in this paper was collected in 1923 during several months' stay in Sweden and Finland. The data from the mills in those countries are average figures for long periods of time, and without claiming that the average figures tabulated in the condensed tables, are the absolute conditions of the different methods in the different countries and I believe that they give a fair illustration of the existing conditions.

Of the data for the American mills some are from personal experience and some were obtained through the courtesy of W. G. MacNaughton of TAPPI, O. L. Berger of the G. D. Jenssen Company, and Stebbins Engineering & Manufacturing Company, to whom I wish to express my gratitude for the valuable information received.

The data obtained are tabulated so that an analysis can be made as to the factors influencing the results, and are tabulated in average condensed tables according to cooking methods, country, species of wood cooked, and grade of pulp made. From these average tables the conclusions are drawn.

There has never been published, so far as I know, a comparison of the methods for making sulphite pulp in different countries although numerous papers have been given on individual conditions.

In this paper three different methods for making sulphite pulp are discussed:

(1) Mitscherlich method.
(2) Ritter-Kellner method.
(3) Quick Cook method.

It is always claimed that the Mitscherlich method compared with Ritter-Kellner, and the Ritter-Kellner compared with the Quick Cook gives:

(1) Higher yield.
(2) Lower consumption of raw materials.
(3) Stronger pulp.
(4) Cleaner pulp.

The yield and the consumption of raw materials are discussed in this paper, but the qualities of the pulp will be taken up at a later meeting of the Association.

In the study of these three methods I have selected mills in Sweden, Finland, United States and Canada; Sweden representing the Mitscherlich method, Finland the Ritter-Kellner, and United States and Canada the Quick Cook method.

General Observations

In Sweden 72 per cent of all sulphite pulp is cooked according to the Mitscherlich process, in Finland 94 per cent is cooked by the Ritter-Kellner method, and in United States the Quick Cook method is most frequently used.

The Ritter-Kellner and the Quick Cook are in reality similar methods. The latter is derived from the former but in many respects is quite different. The Ritter-Kellner process has many points of similarity in operation and procedure to those found in the Mitscherlich process, but which are eliminated in the Quick Cook, making this last more efficient in many ways and saving in time. The "gassing" of the digesters, the liquor draining, the washing of the pulp in the digesters, and the dumping are characteristic procedures of both the Mitscherlich and the Ritter-Kellner methods, while the steaming and refilling of chips are characteristics of the Mitscherlich process only and the blowing of the entire digester charge is used only in the Quick Cook. The principal difference between the Mitscherlich process on one hand and the Ritter-Kellner and the Quick Cook on the other, is that the steam for cooking in the first is applied indirectly, while in the last two the steam is admitted directly into the digester.

In order to illustrate these three methods a short explanation is given of the conditions in three mills using each of these methods, namely:

(1) A Mitscherlich mill, one of the finest in Sweden, making a world-famous brand of strong sulphite.

(2) A Ritter-Kellner mill, which is a new up-to-date mill in Finland, making both easy bleaching and strong pulp for export.

(3) A Quick Cook mill in United States making strong pulp for news, which has developed the Quick Cook to a very high standard of efficiency.

The practices of seasoning the wood are as follows:

1. A Mitscherlich mill seasons its wood so that when used the outer wood and the bark are dry enough to be used economically as fuel, the wood cooked having a moisture content of about 40 per cent. This requires about 5 to 7 months' time.

2. A Ritter-Kellner mill endeavors to get the wood as dry as possible and as a rule seasons its wood about 1 to 1½ years.

3. A Quick Cook has unfortunately no definite system of seasoning the wood and this is one of the main reasons why the sulphite is so variable in different mills using this method of cooking.

The Mitscherlich Mill

The wood cooked in this mill is the spruce grown in northern Sweden (*Picea abies*). After a thorough cleaning and chipping, the chips are conveyed to chip bins above the digester. The digester is filled with chips to the top and when full the cover is loosely put on. The steam valve in the top of the digester is opened and the steam is allowed to pass through the chips. When the steam comes through the bottom valve of the digester it is turned off, the cover is removed and more chips are put into the digester.

This steaming takes about 30 minutes for a digester of 5,297 cu. ft. volume and about 10 to 12 per cent of the digester volume is gained by the steaming. In fact, tests made at the mill in question have shown that without steaming and refilling with chips 13.5 United States tons are obtained per digester as compared with 14.9 tons with steaming, which tends to show that a Mitscherlich cook without steaming does not give a higher yield per digester volume than cooking with direct steam. When the digester is again filled

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to the top, which takes about 15 minutes, the cover is bolted on and steam is again admitted at the top for about 15 minutes.

A better practice employed in many mills is to steam the chips from the bottom while filling the digester. This saves time and it seems as if a higher degree of packing is obtained, judging from the yield figures per digester volume from the mills using this method of steaming. (See table VI, Mills No. 2, 3 and 5.)

The steaming from the top, however, will do a more thorough job in some ways than steaming from the bottom, as the steam has a tendency to distribute more evenly in the digester and consequently more air is driven off than when the steaming is done from the bottom while filling with chips.

The advantages of steaming the chips are as follows:

(1) The air is expelled from the digester and the chips.

(2) A gain in digester space of 10 to 12 per cent by which a larger charge of chips is possible.

(3) When the acid is pumped into the steamed digester a vacuum is created by condensation causing a more thorough penetration of the chips by the acid.

(4) A uniform moisture content of the wood is secured.

(5) The digester contents are rapidly supplied with heat.

The acid is now pumped in and for a digester of this size, 3,354 cu. ft. of cooking acid are used. At the mill in question the cooking acid is a mixture of raw acid and reclaimed acid so balanced that the free SO_2 in the mixture is 3.00 per cent. Table 1 shows the composition of the raw and reclaimed acids and the portions of each taken for charging the digester.

TABLE 1—COMPOSITION OF THE ACID FOR COOKING (Mitscherlich)

Reclaimed acid			Raw acid			Mixture			Acid used	
Total %	Free %	Comb. %	Total %	Free %	Comb. %	Total %	Free %	Comb. %	Recl. cu. m.	Raw cu. m.
4.16	3.04	1.12	2.75	1.67	1.08	4.18	3.00	1.08	92	3
5.08	3.78	13.0	2.75	1.57	1.18	4.18	3.00	1.18	61	34
4.13	2.88	1.25	2.37	1.38	0.99	....	....	....	95	..
4.48	3.20	1.28	3.30	1.76	1.44	4.30	3.00	1.30	82	13
4.32	3.26	1.06	2.52	1.38	1.14	4.07	3.00	1.07	82	13
3.94	2.94	1.00	2.04	1.25	0.79	4.00	3.00	1.00	95	..
4.48	3.36	1.12	2.72	1.52	1.22	4.14	3.00	1.14	80	15

As soon as the acid has risen over the steam coils the steam is turned on. On account of the pre-steaming, the temperature of the acid is increased from about 35 to 75 deg. C. To fill with acid a time of 30 minutes is required, after which 530 cu. ft. of liquor from a digester ready for dumping are put in. This drawing of liquor takes 16 to 18 minutes, making the total charge of cooking liquor 3,884 cu. ft. The liquor taken over has a temperature of 135 deg. C. Many mills instead of taking over liquor at 135 deg. C., take liquor from a digester at 110 degrees C. before the dissolving action of the liquor takes place. Quantities ranging from 500 to 700 cu. ft. are circulating from digester to digester, and besides a saving of steam a saving of sulphur is claimed, in one case being as high as 100 lb. of pyrites per ton of pulp. The steam for cooking is used indirectly by means of four sets of copper coils 1¼ in. in diameter, of a total length of 300 meters (1,000 ft.). Live steam of 85 to 110 lb. pressure is used on all sets under a back pressure of 40 lb. The condensed water is used for boiler feed.

Following is the progress of a normal cook which illustrates the taking up of temperature and pressure.

PROGRESS OF A MITSCHERLICH COOK

Cooking time, hr.	Gage pressure, lb.	Temperature °C	Remarks
0	0	70	
1	14	75	
2	17	85	
3	20	95	
4	25	100	
5	28	105	Digester closed
6	30	106	
7	31	107	
8	32	108	Digester opened
9	42	115	
10	50	120	
11	54	125	
12	57	130	
13	57	134	Digester closed
14	57	135	
15	57	135	
16	57	135	

The temperature is increased to 105 deg. C. after 5 hr. and at this temperature the digester is closed for 3 hr. The temperature reaches 130 deg. C. after 12 hr. and the cooking is finished at 135 deg. C., and 57 lb. in 16 hr. with an acid of about 1.10 per cent combined. To determine the endpoint of the cook, besides the smell and the color of the liquor, the Mitscherlich test is applied. The liquor at the end of the cooking tests about 0.37 per cent SO_2. The top relief is now opened and the digester is relieved until about 14 lb. pressure is reached. Then the liquor is drained off. This procedure takes about 2 hr. After the gassing the liquor tests 0.10 per cent SO_2 with iodine.

Some mills reclaim more of the gas by taking the discharged liquor through a liquor pot, where more gas is recovered by putting the liquor under a slight vacuum created by pumping reclaimed acid through an injector connected with the liquor pot. The recovery, however, is so small that it hardly warrants the installation of the pumping system. Some liquor is frequently taken over to a freshly charged digester.

The liquor is either wasted or used for alcohol recovery. In the latter case it is pumped to a neutralizing tower, where it is neutralized with lime or lime sludge from the sulphate process.

In Mitscherlich mills allowing the liquor to circulate from one digester to another as described, the spent liquor has a sugar content in some cases as high as 2.50 per cent. At some plants the spent liquor is evaporated to 50 per cent solids and used as fuel. This pays for itself but gives no excess saving.

After draining the digester is filled with water and the entire charge dumped into an open pit where the pulp is finally washed. From the pit the pulp is conveyed to separators where the fiber bundles are broken up. It is then taken over knot catchers, diluted and screened.

The Ritter-Kellner Mill

The wood cooked in this plant, like the Mitscherlich mill, is spruce. A table is given showing the weight per unit volume of this wood.

TABLE 2. WEIGHT PER VOLUME OF FINLAND SPRUCE

Wt. per cu. m., kg.	Water content, %	Wt. cu. m. air dry kg.	Wt. per cord air dry, lb.
394	20.8	346	2,755
393	19.9	350	2,800
406	21.1	356	2,850
377	20.33	327	2,615
408	26.9	331	2,655
384	21.0	337	2,690
406	21.1	356	2,850
Average	....	343	2,746

Six stationary insulated digesters of 7,519 cu. ft. volume each are used. The steam for cooking is exhaust steam from turbines at a pressure of 90 lb. and with superheat of 200 to 250 deg. C.

TABLE 3—RATE OF DISAPPEARANCE OF SO_2 AT DIFFERENT DIGESTER TEMPERATURES

Temp. °C	Comb. SO_2 in the acid %	SO_2 in the liquor at the closing of the digester % a.	SO_2 in the liquor at the end of the cook % b.	Line closed, hr. c.	Rate of disappearance of SO_2 per hr. in % of SO_2 in the liquor at the closing of the dig. 100 (a–b) / c x a
126–129	1.15	0.81	0.25	10:00	6.9
130	1.16	1.03	0.39	12:00	5.1
131	1.15	0.67	0.26	9:00	6.9
132	1.12	1.07	0.20	7:00	11.8
133	1.12	0.80	0.24	8:00	7.3
133	1.21	1.01	0.20	8:00	7.9
133	1.15	0.62	0.23	4:40	15.1
134	1.12	1.13	0.23	7:30	10.6
135	1.18	1.10	0.31	6:00	11.8
135	1.19	0.84	0.28	7:30	8.8
131–138	1.18	0.87	0.26	7:50	9.0
137	1.12	1.12	0.30	5:40	14.1
136–138	1.15	1.25	0.54	5:00	11.1
138	1.12	1.08	0.31	6:00	11.6
137–144	1.16	0.85	0.50	2:50	15.0
135–144	0.99	0.98	0.28	4:00	17.7
142	1.15	0.90	0.52	2:30	16.8
140–143	1.15	0.93	0.37	3:30	17.2
140–143	1.18	0.98	0.36	4:00	16.2
145–147	1.28	0.80	0.33	2:15	25.8

The chips are injected into the digester with steam. The acid is pumped in from the bottom, and the digester is filled to the top with 5,472 cu. ft. of acid per cook. The steam is supplied by means of two 3 in. pipes. The direct cooking method is used. The cooking is done as follows:

The digester pressure is taken up to 60 lb. in 2 hr., after which the top relief is opened sufficiently to raise the temperature to 100 deg. C. for 1 hr. or more depending on the moisture content of the chips. The steam and relief valves are now opened again and the temperature is raised to 135 deg. C. after 8 or 9 hrs. at a SO_2 and time required to finish the cook at different temperatures ranging from 126 deg. C. to 147 deg. C. The rate of disappearance of the SO_2 is expressed in per cent of SO_2 in the liquor at the closing of the digester.

A curve (Fig. 1) is plotted with the temperature as abscissa and the rate as ordinate. The two extremes of temperature shows that when the digester is closed at 126 deg. C., 10 hr. are required for the cook to go out as compared with 2:15 hr. at a temperature of 145 to 147 deg. C.

The top relief is now opened and the gas let off until the pressure has dropped to 28 lb. At the beginning of this "gassing" the vapors leaving the digester hold about 35 per cent SO_2, at the end 14 per cent. About 740 lb. SO_2 is recovered per cook by this procedure. When the pressure is down to 28 lb. water is pumped into the digester through the top valve, at the same time as the liquor draining valve is opened in the bottom of the digester and the pulp is in this way washed in the digester. When the pressure has dropped to zero, the bottom cover is opened and the pulp dumped into a concrete pit. Pulp remaining in the digester is hosed out with water. Similar to the Mitscherlich process, the pulp is taken through a separator before screening.

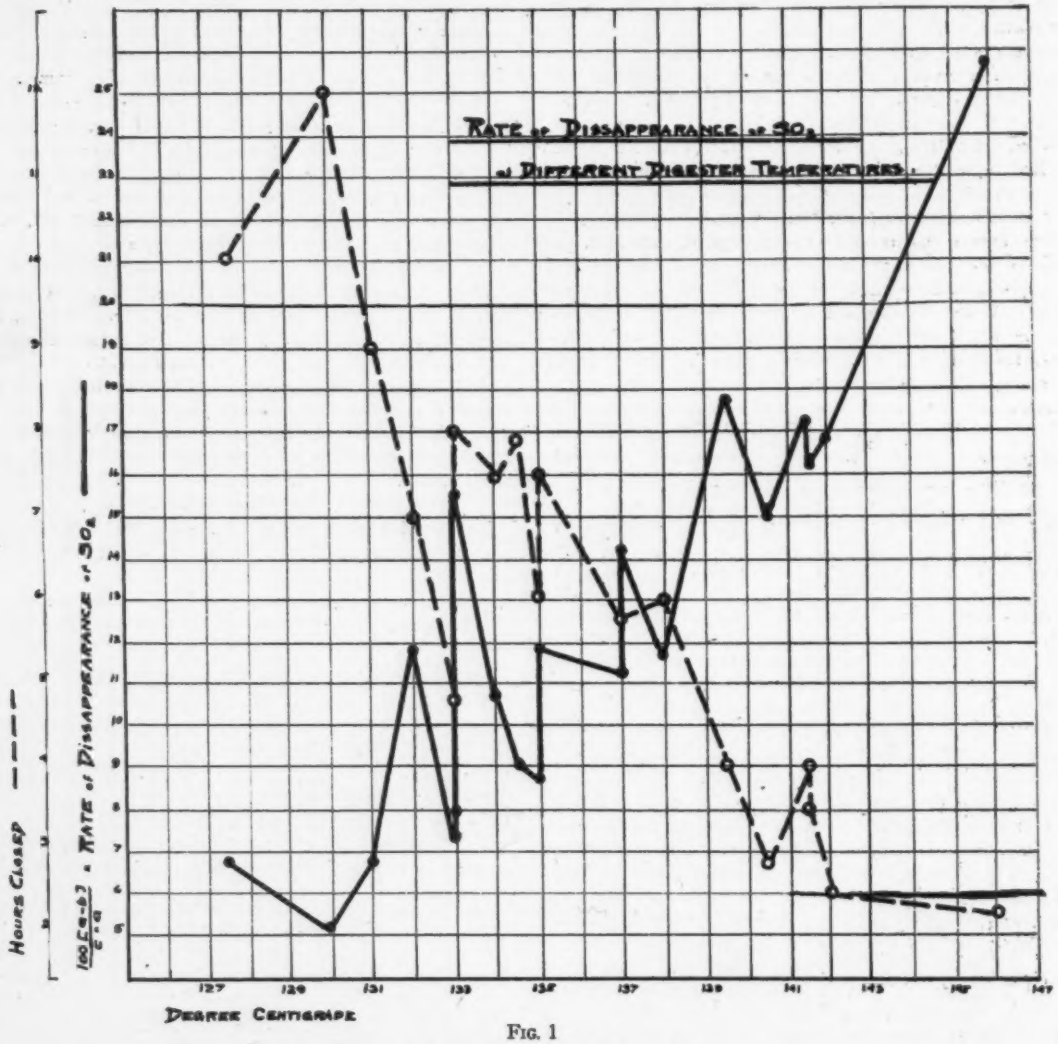

FIG. 1

Rate of disappearance of SO_2 during cooking

pressure of 65 lb. gauge. The iodine test at this point in the cooking is expected to indicate about 1.10 per cent SO_2, when an acid testing about 2.90 per cent free and 1.05 per cent comb. SO_2, is used. The digester is now closed and kept at this temperature and pressure until the color and the odor of the liquor indicates that the pulp is of the quality desired. The iodine test of the liquor shows about 0.30 per cent for easy bleaching pulp or 0.50 per cent SO_2 for strong. This requires about 5½ to 6½ hr. from the closing of the digester. It is interesting to note the relation between time required for finishing the cook and the temperature at this closing of the digester. Table 3 and Fig. 1 cover the disappearance of the

Below is the progress of a typical cook at this mill:

PROGRESS OF A RITTER-KELLNER COOK

Cooking hr.	Pressure, lb. gage	Temp., °C	SO_2 %	Remarks
0	0	35	3.71	
½	1.9	70	3.63	
1	2.6	75	3.12	Top opened after 1:50 hr.
1½	3.25	80	3.15	
2	4.20	88	3.11	
2½	3.70	84	2.78	
3	3.30	91	2.43	
3½	3.40	100	2.26	
4	3.95	105	2.18	
4½	3.50	110	2.06	
5	3.25	113	1.88	
5½	4.60	121	1.60	
6	4.15	127	1.41	Steam and relief closed
6½	4.25	132	1.20	
7	4.40	136	1.14	
7½	4.60	138	1.06	
8	4.80	138	1.00	
9	4.80	138	....	
10	4.80	138	....	
11	4.80	138	....	
12	4.80	138	....	
13	4.80	138	....	
14	4.80	138	....	
14½	4.80	138	.54	"Gassing" started
15½	2.00	127	.14	

The Quick Cook Mill

The wood cooked in this mill is exclusively hemlock grown in northern Wisconsin. Table 4 and 5 show the weight per cord of this wood and the analysis of the same from three different localities.

TABLE 4. WEIGHT PER CORD OF WISCONSIN HEMLOCK

	Wood in its entirety			Wood cleaned for pulp making		
Locality	Wt. per cord wet lb.	Moisture content per cent	Wt. per cord air dry lb.	Wt. per cord wet lb.	Moisture content per cent	Wt. per cord air dry lb.
1.....	3,814	40.8	2,510	3,754	41.9	2,432
	3,827	39.3	2,579	3,651	43.3	2,300
	.....	....	.....	3,730	42.5	2,383
2.....	4,359	42.9	2,764	4,145	45.2	2,524
	4,468	41.9	2,887	3,737	44.6	2,298
3.....	4,568	51.2	2,465	3,604	40.3	2,389
	.....	....	.....	3,722	42.8	2,367

Average, 2,641 lb. per cord.

TABLE 5. ANALYSIS OF WISCONSIN HEMLOCK

Locality	Cold water soluble %	Hot water soluble %	Soluble in 1% NaOH %	Soluble in 7.14% NaOH %	Ether soluble %	Benzine soluble %	Cellulose %	Lignin %	Copper No.	Ash %
1.....	3.10	5.60	15.10	21.10	1.44	5.90	53.3	34.9	6.65	0.37
2.....	3.07	5.81	18.74	23.60	1.11	7.48	53.0	34.2	6.91	0.51
3.....	2.81	5.41	14.21	23.05	1.51	5.33	52.0	36.1	6.34	0.70

After cleaning and chipping, the wood is transported to ordinary chipbins and the chips are filled in the digesters with steam. The digesters are 4,400 cu. ft. capacity and to fill one digester 25 min. is required.

When full the acid is pumped in which takes about 15 min. The steam which has a pressure of 160 lb. and is saturated is now turned on full and the pressure in the digester is taken up to 90 lb. in about 30 min. At this pressure the temperature has increased to about 90 deg. C. and the digester is then closed for 2 hrs. The top relief is then opened and the pressure allowed to drop to 80 lb. where it is kept during the entire cooking. The side relief is used until the temperature has gone up to 135 deg. C., which generally takes 6 hrs. after the turning on of the steam. The digester is now set on dry gas and the cook is blown at a temperature of about 155 deg. C. after 8 hr. cooking at a test of the liquor of 0.15 to 18 per cent SO_2. Below is the average pressure, temperature and concentration of the SO_2 at different length of cooking at this mill.

PROGRESS OF A QUICK CURE

Cooking hr.	Pressure lb. gage	Temp. deg. C	SO_2 per cent	Remarks
0	0	37	4.86	
½	90	95	2.85	Digester closed
2½	90	95	2.35	Relief started
3	80	95	2.20	
3½	80	97	2.04	
4	80	104	1.94	
4½	80	111	1.69	
5	80	119	1.45	
5½	80	128	1.27	
6	80	135	1.01	
6½	80	142	0.78	Dry gas
7	80	147	0.54	
7½	80	153	0.22	
8	80	155	0.15	

In order to make a comparison of the results of the different methods in the different countries, the following information has been collected regarding the production of strong and easy bleaching pulp, and are tabulated in Tables 6, 7, 8, 9, 10.

Discussion of the Tables

Table 6—Pulp Yield Per Digester Space

As to the yield, it was found advisable to use the above as the unit as the pulp yield per digester space gives the fairest comparison and offers a basis for discussion. The table covering the pulp yield per digester volume includes data as to moisture in the chips, and the degree of digestion, both of which have a bearing influencing the results. The pulp yield per digester volume is expressed in. kg./cu.m and in the corresponding U. S. Standard: lb./cu.ft.

Table 7—Production Efficiency

The production efficiency is expressed in kg. per cu. meter digester volume per 24 hr. and in lb. per cu. foot digester volume per 24 hr. which unit includes both the pulp yield per digester space and the total cycle.

Table 8—Pulp Yield Per Unit Unbarked Wood

The pulp yield per unit unbarked wood is expressed in lb. screened pulp per cord of unbarked wood, and the table covers also the woodroom losses for the different mills.

Table 9—Steam and Sulphur Consumption

The steam and sulphur consumption are tabulated in the same table, and are expressed in the U. S. standard. Sulphur in lb. per ton of screened pulp, and steam in lb. per lb. pulp.

The following is an analysis of the factors influencing the different results, as tabulated above, in the basis of the results at the various mills:

A. PULP YIELD PER DIGESTER SPACE.
1. Moisture in chips (if chips are partially frozen).
2. Size of chips.
3. Whether digester is steamed and refilled, or not.
4. Size of digester.
5. Degree of digestion.
6. Kind of wood cooked.

B. PRODUCTION EFFICIENCY.
1. Pulp yield per digester space.
2. Length of time required for cooking and intermediate procedures. (Total cycle.)

C. PULP YIELD PER UNIT UNBARKED WOOD.
1. Woodroom losses.
2. Kind of wood cooked.
3. Degree of digestion.

D. SULPHUR CONSUMPTION.
1. Several local conditions: in efficient reclaiming, leaks, sulphur or pyrite burning, blows at high test, high combined, etc.
2. Proportion of discharged liquor to pulp.
3. Pulp yield per digester space.

E. STEAM CONSUMPTION.
1. Direct or indirect heating.
2. Maximum temperature of digester.

TABLE 6. PULP YIELD PER DIGESTER SPACE

Mill	Cooking method	Country	Grade	Wood cooked	Digester volume cu. m.	Yield per digester M. tons	Yield per digester U. S. tons	Moisture content chips per cent	Pulp yield per dig. space Kg. cu. m.	Pulp yield per dig. space Lb. cu. ft.	Bleach consumption 35% bleach powder per cent
1	Mitsch.	Sweden	Strong	Spruce	150	13.5	14.9	..	90.0	5.62	..
2	Mitsch.	Sweden	Strong	Spruce	150	13.8	15.2	45	92.0	5.74	35
3	Mitsch.	Sweden	Strong	Spruce	135	12.3	13.5	40	91.1	5.68	..
4	Mitsch.	Sweden	Strong	Spruce	156	13.5	14.9	40	86.5	5.40	48
5	Mitsch.	Sweden	Strong	Spruce	130	12.3	13.5	45	94.6	5.90	37
6	Mitsch.	Sweden	Strong	Spruce	150	13.6	15.0	36	90.7	5.66	36
7	Mitsch.	Sweden	Strong	Spruce	180	16.0	17.6	..	88.9	5.55	43
8	Mitsch.	Finland	Strong	Spruce	150	13.5	14.9	..	90.0	5.62	18
6	Mitsch.	Sweden	Easy Bl.	Spruce	150	12.0	13.2	36	80.0	5.00	15
9	Ritt.-K.	Sweden	Strong	Spruce	100	7.8	8.6	..	78.0	4.87	16
10	Ritt.-K.	Finland	Strong	Spruce	213	18.0	19.8	40	84.5	5.27	20
10	Ritt.-K.	Finland	Strong	Spruce	213	17.4	19.1	20	81.7	5.10	20
11	Ritt.-K.	Finland	Strong	Spruce	164	12.5	13.8	40	76.2	4.75	18
12	Ritt.-K.	Finland	Strong	Spruce	250	19.4	21.3	20	77.6	4.84	..
13	Ritt.-K.	Finland	Strong	Spruce	177	14.0	15.4	35	79.1	4.94	20
14	Ritt.-K.	Finland	Strong	Spruce	160	12.0	13.2	35	75.0	4.68	..
15	Ritt.-K.	Sweden	Easy Bl.	Spruce	172.6	12.0	13.2	26	69.5	4.33	8-10
16	Ritt.-K.	Sweden	Easy Bl.	Spruce	150	10.5	11.6	20	70.0	4.37	6-7
9	Ritt.-K.	Sweden	Easy Bl.	Spruce	100	7.3	8.0	..	73.0	4.56	8-9
10	Ritt.-K.	Finland	Easy Bl.	Spruce	213	16.0	17.6	40	75.1	4.69	9-12
10	Ritt.-K.	Finland	Easy Bl.	Spruce	213	14.5	16.0	20	68.1	4.25	9-12
11	Ritt.-K.	Finland	Easy Bl.	Spruce	164	12.0	13.2	40	73.1	4.56	12
17	Ritt.-K.	Finland	Easy Bl.	Spruce	48	3.3	3.6	20	68.8	4.28	12
18	Ritt.-K.	Finland	Easy Bl.	Spruce	235	17.5	19.3	25	74.5	4.65	14
13	Ritt.-K.	Finland	Easy Bl.	Spruce	177	13.0	14.3	20	73.3	4.57	10
14	Ritt.-K.	Finland	Easy Bl.	Spruce	160	11.2	12.3	20	70.0	4.37	10
20	Quick Cook	Canada	Strong	Spruce	120	9.1	10.0	..	75.8	4.74	..
21	Quick Sook	U. S. A.	Strong	Spruce	162	13.3	14.6	..	82.1	5.12	..
27	Quick Cook	U. S. A.	Strong	Spruce & Fir	205	12.5	13.8	..	60.9	3.80	..
28	Quick Cook	U. S. A.	Strong	Spruce & Fir	145	10.0	11.0	..	68.9	4.30	..
19	Quick Cook	U. S. A.	Strong	Hemlock	124	7.5	8.3	37	60.5	3.78	30
25	Quick Cook	U. S. A.	Strong	Hemlock	155	9.1	10.0	..	58.6	3.66	..
22	Quick Cook	U. S. A.	Easy Bl.	Spruce	213	15.5	17.0	35	72.8	4.54	10
21	Quick Cook	U. S. A.	Easy Bl.	Spruce	162	12.5	13.8	..	77.1	4.81	9
23	Quick Cook	Canada	Easy Bl.	Spr. & Fir	223	15.4	16.9	40	69.1	4.31	16
35	Quick Cook	Canada	Easy Bl.	Spr. & Fir	89	5.6	6.0	..	62.3	3.89	17
22	Quick Cook	U. S. A.	Easy Bl.	Hemlock	213	12.3	13.5	35	57.7	3.60	18

3. Local conditions: wet, dry or superheated steam, insulation of digesters and pipelines, etc.
4. Proportion of acid to pulp.
5. Moisture in chips.
6. Pulp yield per digester space.

Pulp Yield Per Digester Space

1. Moisture in Chips.

The moisture in the chips, has a certain bearing on the pulp yield per digester space, due to the fact that the higher the moisture content is in the chips, the greater is the degree of packing; a larger quantity of wood is charged per digester and consequently a higher pulp yield per cook is obtained. The reverse takes place, if chips are partially frozen, as they then take up more space in the digester and consequently a lower yield is effected. The figures cover tests of cooks made in the same digester from the same wood, all factors being equal but the moisture of the wood. The test are made at Mill 10.

Moisture in chips	Yield per digester — Strong pulp	Yield per digester — Easy bleaching pulp
%	tons	tons
40	18.8	17.6
20	19.1	16.0

2. Size of Chips.

That the size of chips cooked must have an influence on the pulp yield per digester space is plainly shown from the figures of the weight of chips of different sizes.

Wt. per cu. ft. a. d. Chips (Hemlock)

	lb.
1. Caught on 1.050″ Screen	8.48
2. Caught on 0.525″ Screen	9.39
3. Caught on 0.185″ Screen	10.51
4. Through 0.185″ Screen	9.72

The smaller the chips, the greater the weight per cu. ft., consequently more wood per digester and higher pulp output per cook. From the point of uniform pulp and low screenings however, it is a general practice to make the chips of the size of fraction 2.

3. Steaming and Refilling.

By the steaming of the digester previous to the pumping of the acid, the chips pack together and volume space is gained, ranging from 10 to 12 per cent of the total digester volume, which space is refilled with chips. This method is employed in the Mitscherlich process of making sulphite, and is the main reason for the high yield obtained by this method. Tests done at the Mill 4, cooking Mitscherlich sulphite without previous steaming showed the following results, compared with the results obtained from the general practice when steaming and refilling are done.

	Yield per digester U. S. tons	Pulp yield per digester space — kg. cu. m.	Pulp yield per digester space — lb cu. ft.
Without steaming	13.5	79.0	4.94
With steaming and refilling	14.9	86.5	5.40

It is noticeable that according to these tests, the pulp yield per digester space, when steaming and refilling is omitted, is the same as average yield per digester space for both Ritter-Kellner and Quick Cook mills, when spruce is cooked; especially when the fact is taken into consideration that pulp cooked in this mill has a bleaching ability of 48 per cent bleaching powder, compared with an average of 19.5 per cent for the Ritter-Kellner mills. In the light of this test the Mitscherlich process should not give a higher yield from the wood digested, than any one of the direct cooking methods.

4. Size of Digester.

That the size of digester or rather the height must have an influence on the pulp yield per digester space, is obvious and is fully noticeable, when the results in the two mills are compared. Both mills make easy bleaching pulp of practically the same quality, the wood and methods of cooking being equal in both cases.

Mill	Digester volume cu. m.	Pulp yield per digester space — kg. cu. m.	Pulp yield per digester space — lb cu. ft.
18	235	74.5	4.65
17	48	68.8	4.28

5. Degree of Digestion.

The most deciding effect on the pulp yield per digester volume is governed by the degree of digestion. If we compare for instance

Mill 10, cooking down to a bleach consumption of 20 per cent and cooking down to 9-12 per cent other factors being equal, we find that the yield in the first case is considerably higher.

Mill	Bleach consumption %	Pulp yield per digester space kg. cu. m.	Pulp yield per digester space lb cu. ft.
10	20	81.7	5.10
10	9-12	68.1	4.25

6. Kind of Wood Cooked.

The last and more important factor in our analysis of conditions influencing the pulp yield per digester volume is of course the wood cooked.

We know that spruce holds 58-60 per cent cellulose, fir 53-56 per cent, and hemlock 49-53 per cent, and quite naturally the yield must vary at least in proportion to the cellulose content of the specimens cooked. The influence of the wood is conclusively shown in Mill 22, cooking easy bleaching pulp from hemlock and spruce separately, and in the condensed Table No. 11.

Mill	Wood cooked	Pulp yield per digester space kg. cu. m.	Pulp yield per digester space lb cu. ft.
22	Spruce	72.8	4.54
22	Hemlock	57.7	3.60

Production Efficiency

1. Pulp Yield Per Digester Space.

That the yield per digester space has a bearing in the production efficiency is obvious and is plainly shown at Mill 10, at equal total cycle.

Mill	Yield per digester space space lb cu. ft.	Total cycle hr.	kg/m³/24 hr.
10	4.69	23½	77
10	4.25	23½	70

TABLE 7. PRODUCTION EFFICIENCY KG. CU. METER DIGESTER, SPACE 24 HRS.

Mill	Cooking method	Dig. Vol. cu. m.	Grade	Wood cooked hr.	Filling of chips hr.	hr.	Steaming hr.	Acid pumping hr.	Actual cooking time hr.
1	Mitsch.	150	Strong	Spruce	.30	...	.45	.30	16.00
2	Mitsch.	150	Strong	Spruce	...	.45*	...	1.15	15.00
3	Mitsch.	135	Strong	Spruce	...	1.15*	...	.30	17.00
4	Mitsch.	156	Strong	Spruce	1.00	...	.45	.45	16.00
5	Mitsch.	130	Strong	Spruce	...	1.00*	...	.45	17.15
6	Mitsch.	150	Strong	Spruce	.30	...	1.30	.45	17.00
8	Mitsch.	150	Strong	Spruce	...	...	...	...	18.00
6	Mitsch.	150	Easy Bl.	Spruce	.30	...	1.30	.45	20.00
9	Ritt.-K.	100	Strong	Spruce	...	1.00*	...	.30	14.00
10	Ritt.-K.	213	Strong	Spruce	.40	...	...	.45	14.30
10	Ritt.-K.	213	Strong	Same as above. Different yield on account of dry chips. See Table 6.					
11	Ritt.-K.	164	Strong	Spruce	.45	...	...	.45	12.00
12	Ritt.-K.	250	Strong	Spruce	...	...	...	...	.....
13	Ritt.-K.	177	Strong	Spruce	.30	...	...	.40	14.00
14	Ritt.-K.	160	Strong	Spruce	.30	...	...	.30	12.00
15	Ritt.-K.	172.6	Easy Bl.	Spruce	...	...	...	.30	18.30
16	Ritt.-K.	150	Easy Bl.	Spruce	.30	...	...	.45	16.00
9	Ritt.-K.	100	Easy Bl.	Spruce	1.00	...	...	.30	19.00
10	Ritt.-K.	213	Easy Bl.	Spruce	.40	...	...	.45	19.00
10	Ritt.-K.	213	Easy Bl.	Spruce	Same as above. Different yield on account of dry chips. See Table 6.				
11	Kitt.-K.	164	Easy Bl.	Spruce	.45	...	...	.45	17.00
17	Ritt.-K.	48	Easy Bl.	Spruce	1.00	...	...	1.15	11.00
18	Ritt.-K.	235	Easy Bl.	Spruce	.45	...	...	.55	14.00
13	Ritt.-K.	177	Easy Bl.	Spruce	.30	...	...	.40	16.00
14	Ritt.-K.	160	Easy Bl.	Spruce	.30	...	...	.30	15.00
20	Quick Cook.	120	Strong	Spruce	...	...	...	...	.....
21	Quick Cook.	162	Strong	Spruce	...	...	...	...	.....
27	Quick Cook.	205	Strong	Spr. & Fir.	...	...	...	...	.....
28	Quick Cook.	145	Strong	Spr. & Fir.	...	...	...	...	.....
19	Quick Cook.	124	Strong	Hemlock	...	...	...	...	.....
25	Quick Cook.	155	Strong	Hemlock	.25	...	...	.15	8.00
22	Quick Cook.	213	Easy Bl.	Spruce	.30	...	...	.45	10.00
21	Quick Cook.	162	Easy Bl.	Spruce	...	...	...	...	.....
23	Quick Cook.	223	Easy Bl.	Spr. & Fir.	...	...	...	...	.....
35	Quick Cook.	89	Easy Bl.	Spr. & Fir.	...	...	...	...	.....
22	Quick Cook.	213	Easy Bl.	Hemlock	.30	...	...	.45	10.00

Mill	Gassing hr.	hr.	Liquor draining hr.	Blowing hr.	Washing hr.	hr.	Dumping hr.	Repair hr.	Total cycle hr.	Yield per ck. m. t.	Kg./cu. m. per 24 hr.	Country
1	...	1.50	...	...	...	1.00	...	.30	21.05	13.5	103	Sweden
2	2.00	...	.45	...	...	.30	...	.30	20.45	13.8	107	Sweden
3	...	2.00	...	...	...	...	1.30	...	22.15	12.3	98	Sweden
4	...	2.00	...	...	...	.30	...	.45	21.45	13.5	95	Sweden
5	1.30	...	2.30	...	...	1.45	...	.30	25.15	12.3	90	Sweden
6	...	2.00	...	...	...	1.30	...	.30	23.45	13.6	92	Sweden
8	...	...	...	...	...	...	...	...	24.00	13.5	90	Finland
6	...	2.00	...	...	...	1.30	...	.30	26.45	12.0	72	Sweden
9	...	1.30	...	15	.30	...	...	...	17.45	7.8	105	Sweden
10	...	2.20	...	...	...	.45	...	...	19.00	18.0	107	Finland
10	...	...	...	...	...	...	...	...	19.00	17.4	104	Finland
11	...	2.00	...	...	.15	...	...	...	16.00	12.5	114	Finland
12	...	...	...	...	...	...	...	...	.....	19.4	...	Finland
13	2.30	...	1.30	...	...	.30	...	...	19.40	14.0	97	Finland
14	...	2.00	...	.15	.15	...	...	...	15.30	12.0	116	Finland
15	...	2.00	...	...	...	1.00	...	...	22.00	12.0	78	Sweden
16	...	2.00	...	...	...	1.15	...	...	20.30	10.5	82	Sweden
9	...	1.30	...	.15	.30	...	...	...	22.45	7.3	77	Sweden
10	...	2.20	...	...	...	.45	...	...	23.30	16.0	77	Finland
10	...	...	...	...	...	...	...	...	23.30	14.5	70	Finland
11	...	2.00	...	.15	.15	...	...	...	21.00	12.0	83	Finland
17	...	...	...	.15	...	...	...	...	13.30	3.3	124	Finland
18	...	3.00	1.00	...	...	1.00	...	...	20.40	17.5	86	Finland
13	...	2.00	...	...	...	1.00	...	...	20.10	13.0	84	Finland
14	...	2.00	...	.15	.15	...	...	...	18.30	11.2	91	Finland
20	...	...	...	...	...	...	...	...	10.30	9.1	174	Canada
21	...	...	...	...	...	...	...	...	10.00	13.3	197	U. S. A.
27	...	...	...	...	...	...	...	...	12.00	12.5	122	U. S. A.
28	...	...	...	...	...	...	...	...	8.45	10.0	189	U. S. A.
19	...	...	...	.07	...	...	...	...	8.47	7.5	165	U. S. A.
25	...	...	...	...	...	...	...	...	8.00	9.1	176	U. S. A.
22	...	...	...	.15	...	...	...	...	11.30	15.5	154	U. S. A.
21	...	...	...	...	...	...	...	...	12.00	12.5	154	U. S. A.
23	...	...	...	...	...	...	...	...	14.00	15.4	119	Canada
35	...	...	...	...	...	...	...	...	8.00	5.6	187	Canada
22	...	...	...	.15	...	...	...	...	11.30	12.3	121	U. S. A.

*Steaming and filling of chips at the same time.

TABLE 8—PULP YIELD PER UNIT UNBARKED WOOD

Mill	Cooking method	Country	Grade	Wood	Wood per ton Pulp, a. d. p. m.	Pulp a. d. per cord of wood, lb.	Wood room losses, %
1.	Mitsch.....	Sweden	Strong	Spruce	7.3	1,093	15
2.	Mitsch.....	Sweden	Strong	Spruce	7.3	1,093	13
4.	Mitsch.....	Sweden	Strong	Spruce	7.3	1,093	13
5.	Mitsch.....	Sweden	Strong	Spruce	7.4	1,077	15
6.	Mitsch.....	Sweden	Strong	Spruce	7.6	1,049	16–21
8.	Mitsch.....	Finland	Strong	Spruce	7.5	1,063	15
6.	Mitsch.....	Sweden	Easy Bl.	Spruce	8.2	972	16–21
9.	Ritt.-K.....	Sweden	Strong	Spruce	7.8	1,023	18
10.	Ritt.-K.....	Finland	Strong	Spruce	7.5	1,064	18
11.	Ritt.-K.....	Finland	Strong	Spruce	7.7	1,036	.....
13.	Ritt.-K.....	Finland	Strong	Spruce	7.8	1,023	17–20
14.	Ritt.-K.....	Finland	Strong	Spruce	8.0	997	16
15.	Ritt.-K.....	Sweden	Easy Bl.	Spruce	8.4	949	15
16.	Ritt.-K.....	Sweden	Easy Bl.	Spruce	8.3	961	13
9.	Ritt.-K.....	Sweden	Easy Bl.	Spruce	8.5	939	18
10.	Ritt.-K.....	Finland	Easy Bl.	Spruce	8.0	997	18
11.	Ritt.-K.....	Finland	Easy Bl.	Spruce	8.0	997	.....
17.	Ritt.-K.....	Finland	Easy Bl.	Spruce	8.5	939	.....
18.	Ritt.-K.....	Finland	Easy Bl.	Spruce	8.1	985	15
13.	Ritt.-K.....	Finland	Easy Bl.	Spruce	8.3	961	17–20
19.	Quick Cook.	U. S. A.	Strong	Hemlock	...	971	10
25.	Quick Cook.	U. S. A.	Strong	Hemlock	...	900	11
31.	Quick Cook.	U. S. A.	Strong	Hemlock	...	1,000	.....
20.	Quick Cook.	Canada	Strong	Spruce	...	1,250	.....
21.	Quick Cook.	U. S. A.	Strong	Spruce	...	1,112	11
33.	Quick Cook.	U. S. A.	Strong	Spruce	...	1,100	.....
24.	Quick Cook.	U. S. A.	Strong	Spruce & fir	...	1,110	.....
27.	Quick Cook.	U. S. A.	Strong	Spruce & fir	...	1,100	.....
30.	Quick Cook.	U. S. A.	Strong	Spruce & fir	...	1,000	.....
32.	Quick Cook.	U. S. A.	Strong	Spruce & fir	...	1,100	.....
22.	Quick Cook.	U. S. A.	Easy Bl.	Hemlock	...	900	.....
26.	Quick Cook.	U. S. A.	Easy Bl.	Hemlock	...	900	.....
22.	Quick Cook.	U. S. A.	Easy Bl.	Spruce	...	1,060	.....
21.	Quick Cook.	U. S. A.	Easy Bl.	Spruce	...	1,000	.....
23.	Quick Cook.	Canada	Easy Bl.	Spruce & fir	...	978	11
29.	Quick Cook.	Canada	Easy Bl.	Spruce & fir	...	1,100	.....

2. Total Cycle.

The cooking time and time required for intermediate procedures, has the largest bearing on the production efficiency, which is conclusively brought out in the condensed tables. Comparison of Mill 10, Mill 17, and Mill 22, with about equal pulp yield per digester space, but different total cycles show this.

Mill	Total cycle, hr.	kg./m³/24 hr
10	23½	70
17	13½	124
22	11½	154

TABLE 9—SULPHUR AND STEAM CONSUMPTION

Mill	Cooking method	Country	Grade	Wood cooked	Sulphur per ton a. d. pulp, lb	Steam per lb a. d. pulp, lb
2.	Mitsch.....	Sweden	Strong	Spruce	250	2.2
3.	Mitsch.....	Sweden	Strong	Spruce	190	2.3
4.	Mitsch.....	Sweden	Strong	Spruce	280	...
5.	Mitsch.....	Sweden	Strong	Spruce	160	...
6.	Mitsch.....	Sweden	Strong	Spruce	180	2.5
8.	Mitsch.....	Finland	Strong	Spruce	180	2.1
6.	Mitsch.....	Sweden	Easy	Spruce	200	2.7
9.	Ritt.-K.....	Sweden	Strong	Spruce	180	3.2
10.	Ritt.-K.....	Finland	Strong	Spruce	210	2.9
10.	Ritt.-K.....	Finland	Strong	Spruce	220	2.8
11.	Ritt.-K.....	Finland	Strong	Spruce	200	3.1
13.	Ritt.-K.....	Finland	Strong	Spruce	185	...
14.	Ritt.-K.....	Finland	Strong	Spruce	190	3.0
15.	Ritt.-K.....	Sweden	Easy	Spruce	210	2.0
16.	Ritt.-K.....	Sweden	Easy	Spruce	220	1.6
9.	Ritt.-K.....	Sweden	Easy	Spruce	200	3.4
10.	Ritt.-K.....	Finland	Easy	Spruce	260	3.3
10.	Ritt.-K.....	Finland	Easy	Spruce	270	3.0
11.	Ritt.-K.....	Finland	Easy	Spruce	200	3.3
17.	Ritt.-K.....	Finland	Easy	Spruce	240	3.0
18.	Ritt.-K.....	Finland	Easy	Spruce	210	2.8
14.	Ritt.-K.....	Finland	Easy	Spruce	190	3.2
19.	Quick Cook.	U. S. A.	Strong	Hemlock	290	3.8
25.	Quick Cook.	U. S. A.	Strong	Hemlock	...	3.5
31.	Quick Cook.	U. S. A.	Strong	Hemlock	280	...
20.	Quick Cook.	Canada	Strong	Spruce	...	...
21.	Quick Cook.	U. S. A.	Strong	Spruce	220	2.1
33.	Quick Cook.	U. S. A.	Strong	Spruce	...	3.1
24.	Quick Cook.	U. S. A.	Strong	Spr. & fir	...	3.6
27.	Quick Cook.	U. S. A.	Strong	Spr. & fir	240	3.8
30.	Quick Cook.	U. S. A.	Strong	Spr. & fir	...	3.3
22.	Quick Cook.	U. S. A.	Easy Bl.	Hemlock	300	3.9
22.	Quick Cook.	U. S. A.	Easy Bl.	Spruce	240	3.1
21.	Quick Cook.	U. S. A.	Easy Bl.	Spruce	240	2.4
23.	Quick Cook.	Canada	Easy Bl.	Spr. & fir	270	2.6
29.	Quick Cook.	Canada	Easy Bl.	Spr. & fir	260	3.5

TABLE 10—COMPOSITION OF THE COOKING ACID

Country	Mill No.	Total SO_2 %	Free SO_2 %	Comb. SO_2 %	Acid System
Sweden	1	4.07	3.00	1.07	Mitsch. System
	2	4.16	3.13	1.03	Mitsch. System
	3	4.13	3.10	1.03	Shamber System
	5	4.35	3.26	1.09	Shamber System
	6	3.96	3.02	0.94	Shamber System
	7	4.30	3.10	1.20	Mitsch. Tower
	15	4.00	2.97	1.03	Mitsch. Tower
	16	4.23	2.93	1.30	Jenssen Tower
Finland	11	4.22	3.02	1.20	Mitsch. Tower
	14	4.50	3.50	1.00	Mitsch. Tower
	12	4.75	3.55	1.20	Concrete Tower
	10	4.50	3.50	1.00	Concrete Tower
	17	4.00	2.90	1.10	Mitsch. Tower
	18	4.67	3.49	1.18	Jenssen Tower
	13	4.22	3.20	1.02	Jenssen Tower
America	23	5.00	4.00	1.00	Jenssen Tower
	24	5.05	4.01	1.04	Barker System
	25	5.94	4.86	1.08	Jenssen Tower
	26	4.80	3.60	1.20	Jenssen Tower
	27	4.00	2.90	1.16	Jenssen Tower
	28	5.00	4.00	1.00	Jenssen Tower
	29	4.80	3.70	1.10	Barker System
	30	5.88	4.58	1.30	Jenssen Tower
	31	4.20	2.80	1.40	Milk of Lime
	32	5.10	3.90	1.02	Jenssen Tower
	33	5.00	4.00	1.00	Jenssen Tower
	19	4.43	3.20	1.23	Jenssen Tower
	34	4.05	2.72	1.30	Stebbins System

The two greatest influencing factors in the pulp yield per unit unbarked wood, is quite obviously the woodroom losses and the kind of wood cooked, which are easily noticeable in the condensed tables, and I refer to a comparison of Ritter-Kellner mills and Quick Cook mills cooking strong pulp from spruce, where practically the same pulp yield per digester space is obtained, the former mill rossing their wood in knife barking machines, and having an average wood room loss of 17.5 per cent, while the Quick Cook mills on this continent, using barking drums in general, seldom run with a wood room loss exceeding 11 per cent.

	Yield per digester space lb per cu. ft.	Wood room losses, %	Yield screened pulp per cord unbarked wood, lb
Ritter-Kellner	79.0	17.5	1,030
Quick cook.....	79.0	11.0	1,154

In this connection, I call attention once more to the above statement, that the Mitscherlich progess does not give a higher yield from the wood than the direct methods, and I refer to the pulp yield per unit unbarked wood, condensed Table 13. In Sweden and Finland the wood used in the manufacturing of sulphite is identical, both as to properties, and the size of the logs, and the average of the results obtained in the Swedish Mitscherlich mills, and the Finnish Ritter-Kellner mills, shown in the condensed tables, prove this statement, if an allowance is made for the lower degree of digestion in the Mitscherlich process, and for the slightly lower wood room losses.

	Wood cooked	Wood room losses %	Bleachability %	Yield strong pulp per cord lb
Mitscherlich	Spruce	14.9	40	1,081
Ritter-Kellner	Spruce	17.5	19.5	1,030

The influence of the kind of wood cooked is obvious, and does not require a separate discussion.

Sulphur Consumption

1. Sulphur or Pyrites Burning.

In the roasting of pyrites, there is always a loss of sulphur in the cinders, and through the formation of SO_3. The roasting can, in well regulated furnaces, be brought down to 6 per cent sulphur remaining in the cinders, which, however, means a loss of 12 to 17 per cent of the total sulphur in the pyrites, depending on the sulphur content of the ore. This is best noticeable in the figure for the average sulphur consumption in Mitscherlich mills, burning sulphur compared with the ones burning pyrites.

	Average sulphur consumption sulphur per ton pulp, lb
Pyrites	265
Sulphur	178

2. Proportion of Discharged Liquor to Pulp.

The largest loss of sulphur in the sulphite process is in form of free, combined, and loosely combined SO_2 remaining in the

liquor at blowing or draining and in form of calcium sulphate, and the test of the liquor and the amount are the determining factors of this loss. A high blow test always means a loss of sulphur and the lower sulphur consumption in the Mitscherlich process, compared with direct cooking is fully realized under the consideration of the attached figures.

	Indirect cooking	Direct cooking
Digester volume	5,295 cu. ft.	5,295 cu. ft.
Pulp yield per digester	14.8 tons	13.4 tons
Acid per digester	3,360 cu. ft.	4,240 cu. ft.
Condensate from cooking steam	None	1,270 cu. ft.
Liquor relief	None	889 cu. ft.
Liquor discharged at end of cook	3,360 cu. ft.	4.630 cu. ft.
Test of liquor at discharge:	%	%
I_2—Test SO_2	0.10	0.10
Loosely combined SO_2	0.20	0.20
Total SO_2	0.30	0.30
In liquor at discharge, SO_2	630 lb.	870 lb.
Sulphur lost in liquor per ton pulp	21.3 lb.	32.5 lb.

3. Pulp Yield Per Digester Space.

The influence of the pulp yield per digester space on the sulphur consumption is obvious from the above and is also shown in the instances given.

Mill	Pulp yield per digester space lb per cu. ft.	Sulphur per ton pulp, lb
5	5.90	160
10	5.10	220
22	3.60	300

Steam Consumption

An analysis of the conditions affecting the steam consumption is rendered difficult due to the large variations in the different mills, on account of favorable or unfavorable conditions. The differences in the steam consumption in the direct and the indirect heating, is, however, noticeable in the condensed Table 15, comparing Mitscherlich with Ritter-Kellner mills, having the same maximum temperatures.

	Steam per lb screened strong pulp
Direct cooking	3.1
Indirect cooking	2.2

Even after making an allowance of 10-12 per cent for higher pulp yield per digester space, in the Mitscherlich process, the direct cooking method has a higher steam consumption than the indirect.

4. Proportion of Acid to Pulp.

The amount of acid to be heated has of course, an important effect in the steam consumption. Take for instance, Mill 16 having rotary, horizontal digesters, and Mill 10; the former using 225 cu. ft. acid per ton pulp, the latter 380 cu. ft. acid per ton pulp, both mills cooking easy bleaching pulp directly, under practically the same conditions.

Mill	Pulp yield per digester space lb per cu. ft.	Acid per ton pulp cu. ft.	Steam consumption lb steam per lb pulp
16	4.37	225	1.6
10	4.25	380	3.0

Average Condensed Tables

TABLE 11—PULP YIELD PER DIGESTER SPACE

Cooking method	Country	Wood cooked	Pulp yield per digester space: Strong pulp kg. cu. m.	Strong pulp cu. ft.	Easy bl. pulp kg. cu. m.	Easy bl. pulp cu. ft.
Mitscherlich	Sweden	Spruce	90.5	85.65	80.0	4.99
Mitscherlich	Finland	Spruce	90.0	95.62	...	...
Ritter-Kellner	Sweden	Spruce	78.0	4.87	70.8	4.42
Ritter-Kellner	Finland	Spruce	79.0	4.93	71.8	4.48
Quick Cook	U.S.A. & Can	Spruce	78.9	4.92	75.0	4.68
Quick Cook	U.S.A. & Can	Spr. & fir	64.9	4.05	65.7	4.10
Quick Cook	U.S.A. & Can	Hemlock	59.6	3.72	57.7	3.60

TABLE 12. PRODUCTION EFFICIENCY

Cooking method	Country	Wood cooked	Production efficiency: Strong pulp kg./cu. m. 24 hr.	Strong pulp lb./cu. ft. 24 hr.	Easy bl. pulp kg./cu. m. 24 hr.	Easy bl. pulp lb./cu. ft. 24 hr.
Mitscherlich	Sweden	Spruce	97	6.05	72	4.49
Mitscherlich	Finland	Spruce	90	5.62	...	....
Ritt.-Kellner	Sweden	Spruce	105	6.55	79	4.93
Ritt.-Kellner	Finland	Spruce	108	6.74	88	5.49
Quick Cook	U. S. A. & Can.	Spruce	186	11.61	154	9.61
Quick Cook	U. S. A. & Can.	Spr. & Fir.	156	9.73	153	9.55
Quick Cook	U. S. A. & Can.	Hemlock	171	10.67	121	7.55

TABLE 13. PULP YIELD UNIT UNBARKED WOOD

Cooking method	Country	Wood cooked	Pulp per cord wood: Strong pulp lb.	Easy bl. pulp lb.
Mitscherlich	Sweden	Spruce	1,081	972
Mitscherlich	Finland	Spruce	1,063	...
Ritt.-Kellner	Sweden	Spruce	1,023	950
Ritt.-Kellner	Finland	Spruce	1,030	976
Quick Cook	U. S. A. & Can.	Spruce	1,154	1,030
Quick Cook	U. S. A. & Can.	Spr. & Fir	1,078	1,039
Quick Cook	U. S. A. & Can.	Hemlock	957	900

TABLE 14. SULPHUR CONSUMPTION

Cooking method	Country	Wood cooked	Sulphur per ton pulp: Strong pulp lb.	Easy bl. pulp lb.
Mitscherlich	Sweden	Spruce	212	200
Mitscherlich	Finland	Spruce	180	...
Ritt.-Kellner	Sweden	Spruce	180	210
Ritt.-Kellner	Finland	Spruce	201	228
Quick Cook	U. S. A. & Can.	Spruce	220	240
Quick Cook	U. S. A. & Can.	Spr. & Fir	240	265
Quick Cook	U. S. A. & Can.	Hemlock	285	300

TABLE 15. STEAM CONSUMPTION

Cooking method	Country	Wood cooked	Steam per lb. pulp: Strong pulp lb	Easy bl. pulp lb
Mitscherlich	Sweden	Spruce	2.3	2.7
Mitscherlich	Finland	Spruce	2.1	...
Ritter-Kellner	Sweden	Spruce	3.2	2.3
Ritter-Kellner	Finland	Spruce	3.0	3.1
Quick Cook	U. S. A. & Can.	Spruce	2.6	2.8
Quick Cook	U. S. A. & Can.	Spr. & Fir	3.6	3.2
Quick Cook	U. S. A. & Can.	Hemlock	3.7	3.9

Conclusions

1. The same yield of strong pulp per digester space is obtained in the Quick Cook mills in this continent when spruce is cooked, as in the Ritter-Kellner mills in Sweden and Finland.

2. A lower yield of easy bleaching pulp is obtained in Finnish and Swedish Ritter-Kellner mills cooking spruce, than in Quick Cook mills in this continent cooking the same kind of wood.

3. A lower yield of both strong and easy bleaching pulp is obtained from a mixture of spruce and fir, than from spruce alone.

4. 23.5 per cent lower yield of strong pulp is obtained from hemlock than from spruce.

5. 23.0 per cent lower yield of easy bleaching pulp is obtained from hemlock than from spruce.

6. In the light of tests done at Mill 4 and of the data in the condensed Table 13, the Mitscherlich process does not give higher yield of pulp from the wood than the direct cooking methods.

7. In case of strong pulp the production efficiency is:
   (a) 14 per cent higher for Ritter-Kellner mills than for Mitscherlich mills.
   (b) 78 per cent higher for Quick Cook mills cooking hemlock than for Mitscherlich mills cooking spruce.
   (c) 100 per cent higher for Quick Cook mills cooking spruce than for Mitscherlich mills.

8. In case of easy bleaching pulp the production efficiency is:
   (a) 16 per cent higher for Ritter-Kellner mills cooking spruce than for Mitscherlich mills.
   (b) 68 per cent higher for Quick Cook mills cooking hemlock than for Mitscherlich mills cooking spruce.
   (c) 114 per cent higher for Quick Cook mills cooking spruce than for Mitscherlich mills.

9. In other words where a Quick Cook mill cooking spruce is using 5 digesters to turn out a certain production a Quick Cook mill cooking hemlock must use 6, a Ritter-Kellner mill 9, and a Mitscherlich mill 10, digesters, in order to turn out the same production.

10. The yield of strong pulp per cord unbarked spruce is higher in Quick Cook mills on this continent than in the Mitscherlich mills, and Ritter-Kellner mills, in Sweden and Finland.

11. When cooking a mixture of spruce and fir, less yield per cord is obtained than when cooking spruce alone. When cooking hemlock 15 per cent less yield per cord is obtained than when cooking spruce.

12. In cooking easy bleaching pulp 7 per cent less yield is obtained than when cooking strong pulp.

13. When burning pyrites, the sulphur consumption is higher than in case of sulphur burning.

14. 12 to 18 lb. more sulphur per ton pulp is consumed in the Ritter-Kellner process than in the Mitscherlich process.

15. When cooking spruce 21 to 30 lb. more sulphur per ton pulp is required in the Quick Cook process than in the Ritter-Kellner process.

16. When cooking a mixture of spruce and fir 20 to 25 lb. more sulphur per ton is required in the Quick Cook process than when cooking spruce only.

17. When cooking hemlock 35 to 45 lb. more sulphur is required in the Quick Cook process than when a mixture of spruce and fir is cooked.

18. 11 per cent higher sulphur consumption is effected in cooking easy bleaching pulp as compared with strong pulp.

19. The steam consumption in the direct cooking process is higher than in the indirect process.

20. The steam consumption increases with the decrease of the yield from the species of wood cooked.

The Detection of Animal Size in Surface Sized Papers

By F. T. Carson*

In the manufacture of surface-sized paper there are but two materials used in appreciable quantities as tub-sizing agents, viz., animal glue or gelatine and starch. The former is usually referred to as animal size. Aside from its primary function the sizing agent produces secondary effects on the physical qualities of the paper, such as improvement in the strength, rattle and feel, the effect being different according to the sizing agent used. Owing to the somewhat intangible nature of certain of these properties it is often impossible to express completely the quality of a sheet of paper by physical tests alone. It is customary, therefore, to specify the component materials which enter into the manufacture of the product. In the case of surface-sized papers the kind of size used is specified in lieu of satisfactory physical tests definitely to predetermine the suitability of a given paper to a given use. Whether starch or animal size has been used in the tub-sizing process is sometimes difficult to determine. The simple test with iodine in potassium iodide solution is used to detect starch. The detection of glue, however, involves some uncertainty for the reason that certain starches give a precipitate or otherwise interfere with the test for glue by the usual procedures. In fact it is maintained that "when either casein or starch is present there is apparently no means of proving the presence or absence of glue."[1]

Precipitate With Starches

Several qualitative tests for glue have been used, the most common of which is the reaction with tannic acid. Certain starches, however, give a precipitate with tannic acid which is very similar to that given by glue. Griffin[2] recommends that the starch, if present, be hydrolyzed by heating with hydrochloric acid on a steam bath before adding the tannic acid. It has been observed also that boiling the tannic acid precipitate will aid in differentiating between the two materials. If due to starch the precipitate will dissolve and reappear on cooling, while if due to glue it will further coalesce and settle out in dense particles which remain intact on cooling. Levi[3] recommends the biuret test, and a modified Nessler's reagent has also been used for the detection of glue. But apparently the most satisfactory test available is the reaction with ammonium molybdate.

Ammonium Molybdate Methods

The ammonium molybdate method is given in the Paper Testing Methods referred to above, but does not appear to have gained much popularity, possibly because of failure to emphasize certain simple but necessary precautions. The precipitate formed by adding ammonium molybdate to a solution of glue is partially or wholly soluble in strongly acid solution. Hence the usual ammonium molybdate solution used for the detection of phosphate is unsuited to the detection of glue. Nor will the precipitate occur in neutral or alkaline solution. The reaction occurs to advantage only in dilute acid solution. It might be supposed that this condition would tend to make the method troublesome. But such is not at all the case, for the aqueous extract of paper is never far from neutral, making possible a uniform qualitative procedure.

Applying the Method

In applying this method it is well to work with definite amounts of material. In this manner a rough quantitative estimation of animal size is possible after some experience. Half a gram of paper boiled with 10 cc. of water gives good results. The aqueous extract should be cooled and filtered before adding the ammonium molybdate reagent. The reagent recommended by Schmidt[4] is prepared by dissolving 3 g. of ammonium molybdate in 250 cc. of water and then adding 25 cc. of nitric acid of specific gravity 1.2 (about one part concentrated acid to three parts water). The reagent is not permanent but on standing for some time will gradually settle out. About one volume of the reagent is added to two volumes of the cold aqueous extract, a white voluminous precipitate indicating glue. The test is very delicate, revealing minute traces of glue, so that if no precipitate results, or even in case of slight turbidity, one can be reasonably certain that the paper has not been tub-sized with glue.

Schmidt's Investigation

Schmidt[4] investigated the action of ammonium molybdate upon a large number of substances, including starches, and it can be inferred from his results that none of the substances other than animal size which might be present in the aqueous extract of paper would precipitate with this reagent. He found this test more sensitive than either the tannic acid or the biuret test. Several cases have come under observation in this laboratory in which the aqueous extract of paper gave a precipitate with tannis acid but after hydrolyzing the starch present no precipitate occurred with tannic acid. In every case the ammonium molybdate test for glue was also negative. Tests were also made using solution of glue and starch and various mixtures. The ammonium molybdate reagent always revealed glue when present without interference by the starch.

In conclusion it may be stated that tests and observations indicate that the ammonium molybdate method as described, possibly supplemented by Griffin's extension of the tannic acid method, will determine positively whether or not paper has been animal glue tub-sized.

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*Assistant physicist, Bureau of Standards. Published by permission of the Director of the Bureau of Standards, U. S. Department of Commerce. The writer is indebted to Dr. V. H. Gottschalk, Research Associate of the American Glue Association, for many suggestions and for the translation of original sources.

[1]Paper Testing Methods of the Technical Association of the Pulp and Paper Industry, 1922, p. 34.

[2]Technical Methods of Analysis, p. 355.

[3]Papierfabr. Vol. 9, p. 365 (1911).

[4]Chem. Zeitung, Vol. 36, p. 313 (1912); Farber-Zeitung, Vol. 24, p. 97 (1913).

The Turpentine Penetration Test for Grease-proof Paper

By H. A. Smith*

The well known blistering test for greaseproof paper is made by holding a burning match close under the sheet and noting the magnitude of the resultant blisters as an indication of the paper's grease-resisting quality. This leaves much to be desired in the way of accuracy, as certain papers which blister only slightly may be more greaseproof than others which give large blisters. In an effort to arrive at a reasonably quick and more satisfactory method for determining the relative greaseproof quality of different papers several ways were tried.

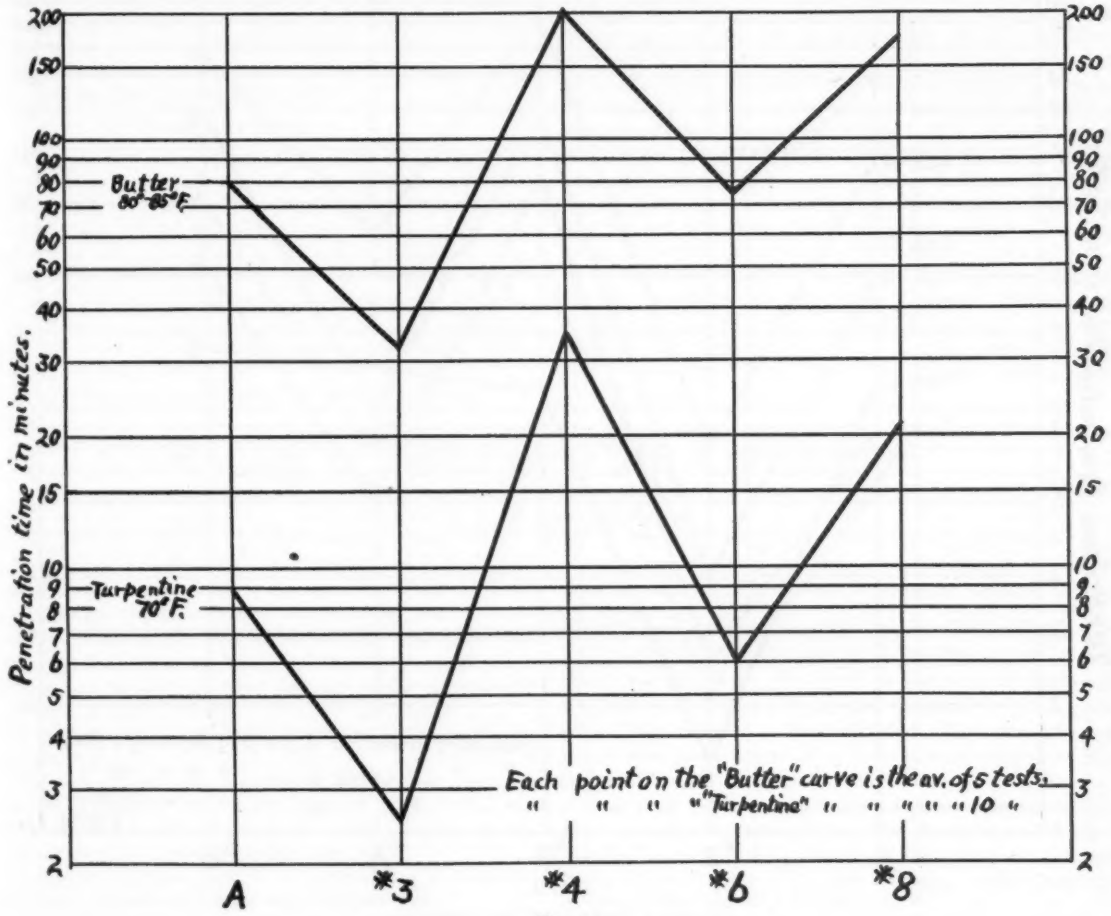

FIG. 1
Comparison of Butter and Turpentine

Method of Bromley Tried

Greases of various sorts, or heavy oils, applied as a practical test took several hours or even days to penetrate the paper, and so unduly prolonged the test. The method of Bromley[1] was then tried. This calls for the drawing of a mark with a copying-ink pencil on one side of the sheet, reversing it, applying a large drop of water to the other side over the mark; and watching the effect on the mark as the water penetrates. The endpoint was very uncertain and in any event the test measured the waterproof, rather than the greaseproof, quality of the tested paper.

Turpentine has long been used to distinguish between greaseproof and nongreaseproof papers. The usual system is to place a little turpentine on the test sheet which is flat on a piece of white paper. If the turpentine does not make any spots on the under paper in several minutes the sheet tested is considered greaseproof.

The following more nearly quantitative test was developed using the penetration time of turpentine as its basis.

A More Quantitative Test

At least 5 *uncreased* sheets about 4 in. square are cut from each sample to be tested, marked, and each one placed on the lower part of a piece of clean white paper about 5 x 7 in. that is flat on a table. It is a help to have the upper righthand corner of each test sheet turned up sharply to serve as a handle, and to have a small weight on the upper lefthand corner of each sheet of white paper, but not on the test sheet. About 2 g. of fairly coarse sand (grains about 1 mm. in diameter do very well) are placed on the center of each test sheet in such a way as to give a low pile about 1 in. in diameter. The time is noted, and with a medicine dropper or a piece of glass tubing several drops of turpentine that has been colored deeply with

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[1]"Outlines of Stationery Testing," p. 44 (1913).

some oil soluble color ("Newport Oil Mahogany D" made by the Newport Chemical Works, Passaic, N. J., works well) are carefully dropped onto the pile of sand on each test sheet. Enough should be used to saturate the sand, but not enough to spread to the edges of the test sheet and so go over onto the white paper. A 2½ or 3 in. watchglass is then inverted over each sand pile to serve the double purpose of lessening evaporation of turpentine and of keeping the greaseproof sheet in better contract with the white paper. Every little while the test sheets are slid back horizontally, taking care not to disturb the watchglasses or piles of sand, the under white paper carefully examined for spots of color from the turpentine, and the greaseproof sheets slid forward into position again. As soon as the *first* spot of color appears under any sheet, the time is noted, the total time in minutes it took the turpentine to penetrate that sheet calculated, and recorded as the *turpentine penetration test* of that sheet. Later the 5 tests on the 5 sheets from one sample are gotten together and averaged to give the T.P.T. of the sample tested. In case there is doubt as to whether a spot on the white paper is caused by turpentine or not, it is often helpful to hold the white paper up to the light. A *fresh* turpentine spot appears translucent. It is necessary to carry on the test where the light is good, preferably before a window. If the test should last long enough to cause appreciable evaporation of turpentine, a drop is added from time to time,—enough to keep the sand practically saturated.

Keeping Track of Group Test Sheets

An easy way to keep track of a group of test sheets run at once is to jot down the time the test started, then every 2 minutes for the first 30 minutes; if the test runs longer than that every 3 minutes for the next 30 minutes; and, if the test continues every 5 minutes till the last sheet is penetrated. Then all sheets being tested are examined at every listed time and the idntification marks of the sheets found penetrated at that time are written alongside the time figure. When the test is finished the various figures for the 5 sheets from one sample are averaged for the T.P.T. of that sample.

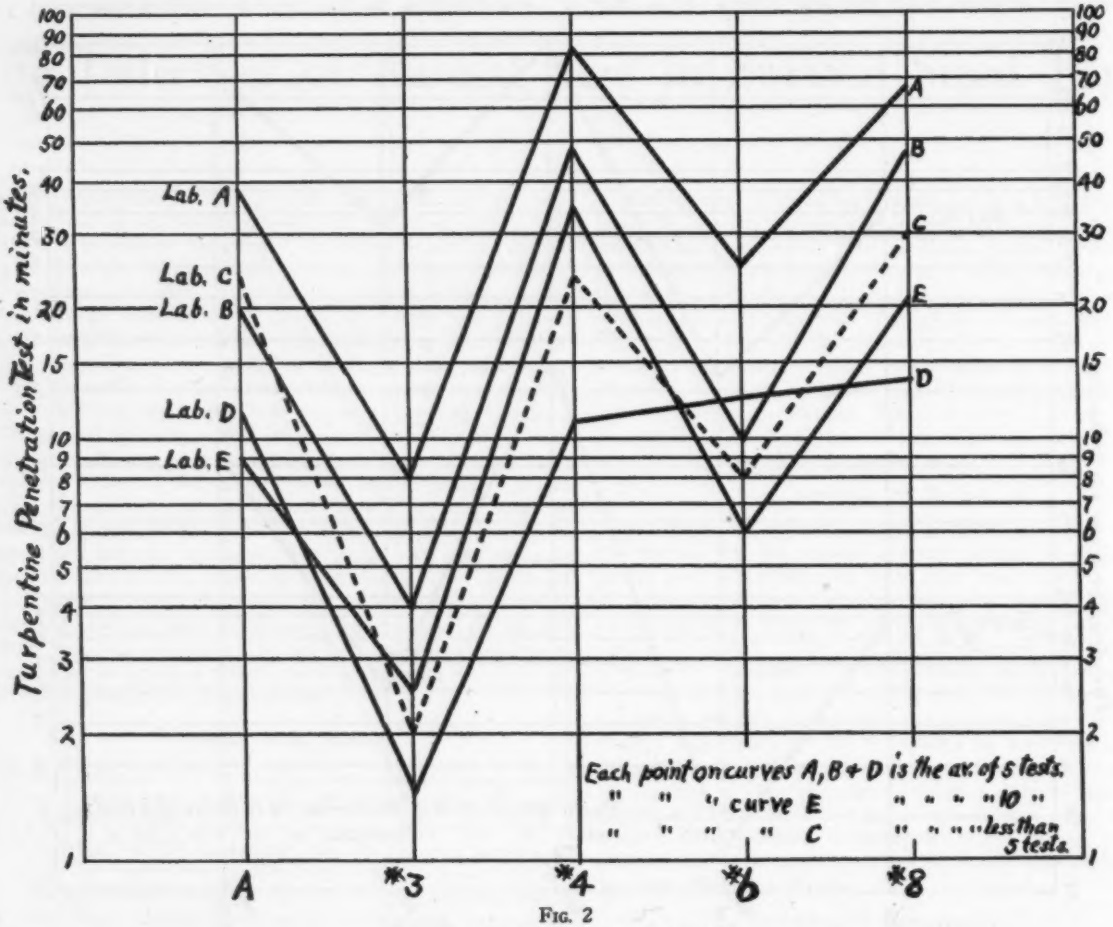


FIG. 2

Comparative Results in Different Laboratories

Working as outlined above at least 15 test sheets can be run at once unless the penetration time proves to be exceptionally short.

Eliminating Errors

In order to eliminate possible errors due to differences in the turpentine used, to differences in the conditions under which the tests are made, or to the personal equation in determining the end-point, this test should be made a comparative one whenever possible. That is, one set of sheets from a sample of known quality should be tested together with the sheets from the sample whose quality is being determined.

When carefully run this test gives the penetration time for the least greaseproof point in the tested area, which is what is wanted, as it is the weakest points that give trouble through penetration of grease in actual use.

Penetration of Turpentine and Butter

Tests were run in order to find the relation between the penetration times of turpentine and of butter on a group of 5 samples. Ten turpentine penetrations were made on each sample at room temperature (about 70° F.) and five butter penetrations at 80° to 85° F. The butter tests were run at the higher temperature in order to cut down the time of testing by keeping the grease in a semi-fluid state. Results are given graphically in Fig. 1.

On a chart of this kind when two curves are parallel it shows that the values plotted on one curve bear a constant ratio to the corresponding values plotted on the other. It is easily seen that the two curves of Fig. 1 approach parallelism, and hence that the turpentine penetration test has a reasonably constant ratio to the butter penetration test, on the various samples. At least the ratio is nearly enough constant to indicate that turpentine can be reliably used to test the greaseproof quality of paper.

Comparing Results

In order to see how results obtained by different people would compare, test sheets from the 5 samples used in the butter-turpentine comparison which were originally selected from the products of different manufacturers as covering a wide quality range were submitted to four other laboratories to be given the turpentine penetration test. The method they follow did not call for the use of any sand, and so differs in that slight respect from the one given here. Sand (the use of which was suggested by F. T. Carson of the Bureau of Standards) would have made no difference in the results which are shown in Fig. 2.

Note the close approach to parallelism of the curves showing tests obtained by laboratories A, B, C, and E. Although the absolute figures on penetration times found by the different laboratories vary widely, each found almost the same relationship among the samples, and so checked each other fairly well when the test is considered as a comparative one. The results of Laboratory C are averages of less than 5 tests on each sample and so may be out somewhat on that account.

Why laboratory D should be so out of line in its findings on sample No. 6 is not known. It is possible that the paper from which these test sheets were taken was not uniform.

Causes of Large Differences in Figures

The large differences in the absolute figures found by the various laboratories may be due to any or all of the possible causes mentioned at the end of the testing method, but are most probably due chiefly to the last named,—the personal equation in determining the endpoint. In fact one laboratory reported difficulty in determining when penetration became general. It is the *first* appearance of color that should be noted, and not the much more indefinite time when penetration becomes general. Laboratory E had done a good deal of work with the method and through greater familiarity with the test may have selected an earlier endpoint. So far as is known the other laboratories had never tried the test before.

The following laboratories cooperated in trying out the proposed method: American Writing Paper Company, Holyoke, Mass.; Bureau of Standards, Paper Section, Washington, D. C.; Hamersley Manufacturing Company, Garfield, N. J.; Mt. Tom Sulphite Company, Easthampton, Mass., and United States Testing Company, New York City.

Report of Sulphite Pulp Committee

By R. A. Hayward, Chairman

The efforts of the committee have been divided into several lines, each member of the committee taking charge of one of the divisions.

Investigations have been made along the following lines:

1. Methods of testing the bleachability of pulp before charging the bleachers. This work has been carried on with an effort to determine the best method of testing the pulp so that it would be possible to add the proper amount of bleach for the charge.

2. The various means of effecting economies in the steam required for cooking.

3. An effort has been made to develop more accurate means of measuring the economy of acid plant operation. This work has been carried on with a view of making it possible to compare one plant with another in a more intelligent way.

4. Investigation has been carried on to determine the various ways and means of measuring wood into a sulphite mill.

5. R. N. Miller of the Forest Products Laboratory has been carrying forward his work on the Chemistry of the Sulphite Process.

Some of the members of the committee are ready to report on the work that they have been investigating, others have not completed their investigations and are not ready at this time to make a report or recommendations.

During the past year there have been some interesting developments in the sulphite process. Most of these developments have been based on an effort to increase the yield from the wood or with a view of effecting other economies in the process.

One of the plants in the middle west very recently started on a new process whereby they are cooking their pulp with a neutral sodium sulphite. This represents an interesting departure from the present method of cooking. It will be interesting to see how this process works out and it is hoped that a report can be made on it in another year.

A great deal of work has been done through the west on a patented process involving the use of reducing reagents, particularly zinc dust, in the sulphite digesters. By maintaining a strongly reducing condition in the digester it has been possible to carry a higher combined acid. The result of this work has indicated that a higher yield is obtained from the wood and a better quality of pulp is also produced. The unbleached pulp is brighter in color and requires less bleach to bring it to the standard color of bleached sulphite.

Some work has also been carried with another patented process which reclaims the heat and gas from the relief of the digesters. This was accomplished by relieving from one digester into another during the early stages of the cook. This has already been reported on through the Technical Section.

An investigation has been made of the various methods that are now being used for testing the strength of the sulphite pulp. Very few of the mills are using the exact method adopted by the Technical Association a few years ago. Most of the mills have found that a beating curve is of more value than the single point as recommended in the Standard Method: This beating curve is made up by beating the pulp in the ball mill and testing it after every 1,000 revolutions. This curve is of value in determining the characteristics of the pulp. Several of the mills are using a small beater for making these strength tests. A small beater has the advantage that the tests can be made more rapidly and the action of the beater more nearly approaches the conditions that exist in the paper mills. The use of the beater has the disadvantage that it is hard for one mill to check the tests of another mill on the same pulp.

During the coming year it will be desirable to revise the standard methods of testing in the sulphite mill and bring these methods up to date according to the practices that are now in use.

Drying and Conditioning Gummed Paper

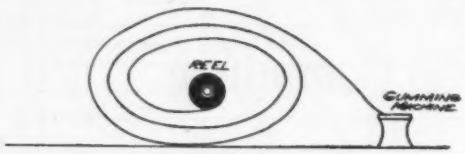
By J. O. Ross*

Discussing the proper kind of gummed paper drier is very much like discussing the proper type of house that a man should build.

Nearly every gummed paper manufacturer has his own ideas as to how the drier should be built and even has his own ideas as to the results that should be accomplished. There is probably no branch of the paper industry where there has been so little standardization as in the drying. Usually each man believes that his own particular drier is the best, although we encountered two cases where each man thought that the other man's system was better than his own. We suggested that they swap driers and find out the flaws in the other system at first-hand. I fully expect that many gummed paper men are going to disagree with many things in this paper. I feel that no one is in a position to say just what system should be used and can only present some of the different types and some of their advantages and disadvantages and depend on a discussion among the various interested parties to establish some sort of common ground.

Two Classes of Gummed Paper Driers

In general gummed paper driers are of two different classes. First the driers which hold the paper under tension, and second those which dry the paper without tension. Perhaps the best known type of the first class is the so-called "Crowell Drier." This consists of a machine which takes the paper through the gumming machine and carries it over a spiral finally winding up in the center of the spiral somewhat as shown on the sketch. The entire Crowell machine is enclosed and the paper is dried by hot air directed on the surface of the sheet. The enclosure prevents the heat escaping into the work room and keeps it in contact with the sheet. There are many adaptations of the Crowell machine. In some cases the paper is carried over a large drum instead of a scroll. This drum may be enclosed, with steam admitted in the interior operating very much like a paper machine drier and the heat is transmitted through the paper to dry the gum on the surface. This is improved by blowing a blast of hot air on the gummed surface so that all the heat for evaporating the moisture does not have to go through the sheet. This works fairly well if speeds are maintained constant, if the gumming mixture is always the same, if there are no stops and if the paper must not dry too much. However, it is a good deal like passing a wet surface through a flame. If it passes through rapidly enough no injury results due to the cooling effect by the evaporation of the moisture. If the material is stopped, however, and becomes dry it immediately burns up. In general this cylinder method has not been very satisfactory.



CROWELL DRYER
TENSION DRYER

A better scheme is to use a skeleton wheel or slatted drum, carry the paper around the circumference of it and blow hot air on the outside of the gummed surface. Hot air is also often introduced inside the wheel so as to raise the temperature of the paper which assists the drying. In some cases two drums are used, the paper passing first over one then over an idler roll and finally over the second drum in such a way that the gummed surface is outside.

Another system of drying where the paper is carried under tension is to carry it through flat after leaving the gumming machine being carried either on a belt or on rollers. In this case there is usually a combination of heating methods. Hot air is blown in at one end of the enclosed drier and taken out at the other and in addition to this steam coils are placed above the gummed surface so that the radiated heat and also the radiant heat helps to dry the gum.

The machines so far described operate with the paper under tension, that is they hold the sheet and in that way prevent undue curling of the paper, which is one of the very serious difficulties in drying gummed paper. Gummed paper will curl on the edges to an extent never encountered in coated paper or wall paper. If a sheet of paper is gummed and laid on a flat table, in an ordinary atmosphere it will often curl so much as to form a tube. This tendency has led to installing drum driers or roller driers crowned in the middle so that the paper passes through the drier in an arched form which has a tendency to stop the edges curling. Other means have been tried of wetting the underside of the sheet on the edges so that the edge of the paper is wet not only where the gum is applied but on the underside so that the shrinkage of the two sides is more nearly the same, eliminating part of the curling. The great trouble with all means of carrying the paper under tension is the very short time allowed for drying.

The Factors of Time and Heat

To dry a piece of gummed paper, two elements enter. The first is the time allowed for drying, and the second is the amount of heat or drying air that must be supplied. It will be very evident that the shorter the time allowed for drying, the greater the temperature and the more air that must be used. This brings in a complication. If a sheet of gummed paper is put through too high a temperature it has an injurious effect on the gum after it has reached a certain stage in the drying process very much like a sheet of coated paper, which can be subjected to a considerable degree of heat when the paper is wet. This is done in the case of double coaters by using a very high temperature on the floater. No injurious effect is caused due to the cooling effect produced by evaporation, When the paper has been more than half dried, this high temperature is decidedly objectionable owing to the danger of overdrying. It is impossible to design or regulate a high temperature drier that will dry paper very rapidly until it reaches the proper percentage of moisture and which will stop at that desired point.

All paper contains a fixed percentage of moisture which is dependent entirely on the condition of the atmosphere surrounding the paper. If the paper is exposed to a low temperature and high humidity it will continue to contain a high percentage of moisture and will contain that regardless of how long it is exposed to this atmosphere. If the atmosphere is raised in temperature or decreased in humidity the paper will immediately dry out until it again reaches a balance, dependent entirely on the temperature and humidity of the surrounding air. It will then stay at that point until the atmosphere is again changed to a higher temperature and lower moisture content in which case it will immediately dry out the paper again still further.

The Ideal Drying System

It will therefore be evident that the ideal drying system as far as quality is concerned would be to surround the paper with an atmosphere which would be exactly correct in temperature and humidity to produce paper containing the proper percentage of moisture. A temperature of 70 deg. F. and about 60 per cent humidity, which is usual in an ordinary office or warehouse, will produce paper with about 6 per cent moisture content. Therefore

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if this paper could be dried during the manufacture with a temperature of 70 deg. F. and 60 per cent it would gradually give up moisture until it reached 6 per cent and would never go below that point regardless of how long it remained in the drier.

The flaw in this kind of system would be that the paper would dry very slowly. When the paper reached 10 per cent moisture content it would become very slow drying and by the time it reached 7 per cent it would be so slow that it would probably take as long to drop from 7 to 6 per cent as it did to drop from 40 to 7 per cent. Therefore it is not practical to install a drying system of that kind. With a high temperature drier, however, which is necessary if paper is to be dried fast, it means that if the paper is allowed to remain in that atmosphere it will be practically bone dry. The more time that is given to the drying, the less risk there is of overdrying the sheet so that the time element, as it is called, has a very important bearing on the quality of the sheet.

All tension machines have this inherent defect. If gummed paper is being run through at a speed of 100 ft. per minute and carried over a steam drum 30 ft. in diameter, which would be out of the question, it would still have only 1 minute for drying. That is the reason that the Crowell drier uses the spiral. It operates about the same as if using a larger number of cylinders but instead of mounting them one after the other they mount them one inside the other so as to save space.

The drier which carries the paper through flat either on rollers or belts also has the same trouble. If we are to allow 1 minute for drying and wanted to run 100 ft. per minute, it would mean a drier 100 ft. long. Experiments have been made and some driers have been built to carry the paper back and forth several times so as to cut down the total length. It means that the wet side of the sheet must be in contact with rollers or belt somewhere and the gummed surface must be dried out sufficiently in one run through to avoid any injury to the surface. This very strictly limits the length of time that can be allowed for drying.

The Festoon System

The best method so far found of giving a long time element for drying is the so-called festoon system. This is very commonly used in drying coated. It means hanging the paper up in loops over

TENSION DRYER
STRAIGHT TYPE WALDRON DRYER

sticks which are carried along on chains. The greatest advantage of the festoon system is the length of time that can be provided. It will be remembered that a flat drier carrying the paper through horizontally 100 ft. long would only allow the paper 1 minute to dry if it was running at 100 ft. per minute. Now let us look at a festoon system under the same conditions. A festoon system 100 ft. long, if the sticks were placed on 8 in. centers would have 150 sticks in 100 ft. of drier length. If the paper had festoons 6 ft. deep there would be approximately 12½ ft. of paper to each loop and with 150 loops we would have approximately 1875 ft. of paper that would be hanging up in the drier only 100 ft. long. If this paper was running at 100 ft. a minute we would have 18¾ min. time for drying. This means that lower temperature, higher humidity and slower drying can be used, which would more nearly approach the ideal condition.

Gummed paper dried in festoons would not be in nearly so much danger of overdrying and it has been adopted by many gummed paper manufacturers. It will be seen at once that the paper is not under tension and that immediately raises the question as to the curling effect. Some companies in experimenting with festoon driers found that the paper curled so badly that it slowed down the reeling of the paper and in some cases means had to be provided for flattening out the sheet before going on to the reels. Part of this trouble it was found could be overcome by a different mixture of gum but regardless of this change there is undoubtedly more danger of curling the edges with a festoon system than with a tension machine.

Introducing Humidity

Experiments were then conducted with the idea of introducing humidity to the paper just before it goes on the reels and it was found that that stopped a great deal of the curling. The edges of the paper which were the quickest to dry out now became the

FESTOON DRYER
NO TENSION

quickest to absorb moisture and as the edge absorbed moisture the skin tension of the sheet was released with the result that the edges began to uncurl. This also gave an opportunity to incorporate the idea of having a fixed temperature and humidity to produce a fixed moisture content in the sheet and yet have quite rapid drying. The drier can be set for a temperature and humidity that would tend to overdry the sheet but at the very end of the process a different atmospheric condition can be applied to prevent the sheet overdrying and if it has already become overdry to put moisture back equal to what it should contain. This is the model festoon drier and presents many advantages.

Differences of Opinion

Experiments have been worked out for various combinations. It is surprising the difference of opinions that exists among the gummed paper manufacturers as to what really should be accomplished. One opinion is that as gummed paper passes through the gumming machine, a high temperature should be applied at once in order to set the coating. This temperature is much higher than should be carried through the complete drier and it is very important not to have curling start during this setting process. This has led to the opinion that the ideal system would be to run it under tension over a drum, blow a very hot blast of air on it and then when the gum is set form a festoon and finish the drying at a low temperature and fixed humidity. In this way the large percentage of the drying would be accomplished under the high temperature and the rest of the process would consist of a very slow even drying. **That is one theory.**

The other theory seems to be almost the opposite; that the paper should dry under atmospheric control so as to prevent the paper curling on the edges until the moisture is almost down to the desired point. It will be remembered in the previous discussion it was pointed out that if the proper final temperature and humidity were used the paper would dry out quite quickly at the beginning when it contained a large amount of moisture but would be very slow in getting down from 10 to 6 per cent moisture. This second theory therefore takes account of that. The paper is put through air conditioning driers which gives a mild drying effect, keeps the paper from curling and dries it down to about 10 per cent moisture content. This is not low enough moisture content for the requirements and the paper is then put over a drum and dried down quickly to the required amount and at the same time held under tension so that it will not curl. It is recognized that if the machine should stop, the paper on the drum will probably be spoiled but the amount of paper carried on a comparatively small drum is very small compared to the amount of paper in the whole drier and with the advantage of the even drying, the mild conditions and the elimination of the curl, compensates for the small amount of waste that might be on the drum.

This has led to two almost opposite systems. One is to put in a system running over a hot drum first and then on to a festoon. The other is to go over a festoon first and then over a drum.

There is perhaps nothing that will show the widely varying difference in the gummed paper industry more than these two theories of drying and a discussion among the gummed paper manufacturers as to which of these two systems is correct, assuming that either is correct, would bring out the greatest difference of opinion that any question possibly can.

There seems to be quite a difference whether animal glue, fish glue, or dextrine is used and when gummed paper driers are being considered local conditions must be taken into account.

I believe the festoon drier offers a great many advantages but it is a serious step for any mill to change over from a tension drier to the festoon drier. Paper which has run perfectly satisfactory on the tension drier will be found to give trouble on the festoons. Conversely if a mill has been operating festoon driers and should change from a tension machine they are apt to be very much discouraged over the lack of drying time and the very high temperature that is required.

Causes of Deterioration of Color in Pulp and Paper

By Martin L. Griffin*

At the last general meeting of the Technical Association C. S. Hamm presented a paper dealing with the deterioration of the color of soda pulp. In my brief discussion I wish to broaden the scope of the inquiry to include paper stock generally and bleached cotton textiles.

It is a matter of common knowledge that all wood pulps and papers made from them discolor on aging much faster than rag half-stuff and rag papers. Papers composed largely of groundwood discolor on a few hours' exposure to sunlight. Groundwood contains no mineral chemical substances other than those composing the ash. We cannot therefore attribute discoloration of groundwood to any chemical treatment leaving residues behind.

Chemists familiar with the soda process know that the pulp, as it exists in the digester before blowing, is very light colored and acquires the dark color almost instantaneously when exposed to the air.

Important Fact in Making Pulp

Plant growth generally produces cellulose and the products of lignification called lignocellulose. All processes dealing with a separation of these two constituents for high grade products regard the lignifying substances as impurities. These are more reactive and sensitive to chemical change. Upon this fact depends all the commercial processes for making pulp and bleaching textiles. Perhaps we should not say that the natural impurities of cotton are the products of lignification, but for this discussion we may consider them in the same class.

Harsh and excessive treatment of cotton will tend to degrade it and make it more reactive to natural influences resulting in an inclination to discoloration. When carefully bleached (cleansed) it will not react with iodine, but with harsh and prolonged treatment it tends to break down and will react blue and even purple with this reagent. Cotton is the purest form of cellulose known, and yet it requires a very thorough treatment to free it from every vestige of impurities if cotton cloth is to remain white on the shelves of the retail dry-goods dealer.

Cotton duck for white shoes with rubber soles must stand an even severer test. Various forms of aniline are used as accelerators in the vulcanizing processes, and if there are even traces of furfural-bearing impurities remaining in the cloth it will discolor.

Varying Proportions of Cellulose

Different woods contain varying proportions of cellulose and lignocellulose which necessitates a selective treatment. Those containing larger amounts of lignifying tissues and intercellular substances, such as tannin and resins, will be the most difficult to free from residual impurities. This is a matter of common experience. Northern white poplar will yield a pulp which will discolor less easily than the southern variety. Straws furnish a blend of cellulose and lignocellulose which will make a quality of paper difficult to match. In England and Scotland esparto has been used for a great many years for making high grade book and envelope paper, but I have never seen a piece of paper made from esparto which would not age to a pinkish tint in a short while in an atmosphere containing traces of aniline fume, which is a test for furfural-yielding substances and a warning that they will discolor with age. The test we apply to white cotton fabrics to determine if they are "well bottomed" or bleached, is to subject cuttings to an atmosphere of steam under a little pressure for about two hours. If they contain residual impurities they will discolor appreciably.

In textile finishing where scouring processes with detergents are employed, as in degumming silk, we know that to free the goods from the last traces of soap residues we must use a little soda ash in the finishing rinsing. This is because weak solutions of soap hydrolize, leaving a film deposit of fat or oil as the case may be, deposited on the cloth.

Thus, then, it will be doubly difficult to remove the last traces of impurities from pulp cooked by the alkaline processes, because the black liquors will contain crude resinous soaps, and in the washing process when the washings become dilute they hydrolize and fix filmy resinous residues on the fiber, which results in discoloration by oxidation. It is well known that even the rosin from engine sizing is a menace to permanent white in high grade papers.

It is true that slow drying of pulp and paper will cause impurities to migrate, by capillary attraction, to the surface exposed, but this is not the answer here, because with rapid machine drying, impurities have no time to migrate.

Cross and Bevan's Views

The whole subject is dealt with very tersely yet fully in a report of a committee of the Society of Arts in 1898, on the "Deterioration of Paper" and contained in Cross & Bevan's book, "Researches on Cellulose," from which I quote:

"The report first discusses the two directions of depreciation in use: (1) Actual disintegration shown by loss of resistance to fracture by simple strain, and by loss of elasticity—that is, increase of brittleness; (2) Discoloration. These are independent effects, but often concurrent. They are the result of chemical change of the cellulose basis of the paper, brought about by acids or oxidants used in the process of manufacture, and not completely removed from the pulp, or by acid products of bleaching—as oxycelluloses or chlorinated derivatives; again, by the starch used as a sizing agent, or by oxidations induced by rosin constituents when the rosin is used in excess. Discoloration is an attendant phenomenon of these changes, but is more frequently due to the low grade celluloses (esparto and straw) and lignocelluloses (mechanical wood pulp)."

Thus we come to appreciate the causes for discoloration in pulps and papers. The most permanent white may be expected from those raw materials which are purest in nature and are treated by very gentle processes. By as much as papermaking raw materials contain adventitious substances other than normal celluloses, by so much is our problem to make an enduring white paper involved, and to make products as good as they can be or are expected to be, will require great skill and care in the processes.

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Electrical Maintenance in Paper and Pulp Mills

By H. L. Hayes*

Maintenance is generally distinguished from ordinary repair work in that it includes the inspection of equipment and the making of minor repairs when work can be done with least loss of production, and it also takes into consideration prolonging the life of equipment which may otherwise be shortened by premature breakdowns. Several years ago a steam engineer stated that he had obtained a good position because, in his previous position, he had been fortunate enough to have had a large number of breakdowns and, due to this experience, had become particularly expert in making repairs. Stress was laid on the fact that the only way to learn about apparatus is to get it running after a breakdown. With the best of maintenance programs there will still be plenty of opportunities to get breakdown experience, but a good maintenance crew will avoid many times the making of extensive repairs.

Maintenance work can be carried to extremes, thereby being unduly expensive and yet not accomplish the desired results. To obtain a proper balance of values, maintenance work should be systematic.

Keeping of Records

The first requirement of systematic maintenance is the keeping of records. Some men, especially in the smaller mills, may be inclined to scoff at records as being unnecessary and only so much red tape, but there is reason to believe that all mills need practically the same information and should keep the same records, with possibly minor changes to suit local conditions. In the larger mills it may take all of the time of one or even several men, while in others it may only require part time of one man, but in all mills complete maintenance records should be kept.

This article deals with electrical equipment, especially motors and motor starters, but the idea can be applied to all apparatus.

Regardless of the kind of industry using them motors have the same general characteristics, but as to the records there is a wide divergence in the information to keep and the manner of keeping it. There is generally a tendency to keep too much data on one form. On cards for motors, there is often kept not only the motor specifications, which are practically constant, but also variable data such as sizes of pulleys, fuses or overload settings, load readings, motor-starter rating, driven load, etc. All these variable data are subject to change every time a motor is moved to a new location with the result that a new card is necessary or the old one corrected. There should, therefore, be two cards for each piece of listed apparatus, one of which is called the "Specification" card and the other the "Maintenance and Service" card. The "Specification" card should contain the following data:

Data On Specification Card

1. Number as assigned by mill.
2. Where purchased with date and purchase price.
3. Where first installed, with date.
4. Complete name plate rating including manufacturer's name.
5. Efficiency, power factor and heating guarantees.
6. Winding data, such as coil specifications, connections, number of coils, coil throw, etc.
7. Mechanical data, such as bearings, oil gages, oil rings, shaft sizes, etc.
8. Miscellaneous data for brushes, collector rings, etc., and space for general remarks.

Separate specification cards can be kept for each individual piece of apparatus, but those for motor starters and general equipment cannot have quite the complete printed form that is possible for motors, because there is greater variety of individual parts. However, contacts, starting coils, overload coils and operating mechanism are common to all types and printed headings may be used, but there should also be a large space left for the listing of odd parts. It will be noted that the specification data are seldom subject to change and, therefore, should be kept by itself. Complete information about old apparatus is hard to obtain, and it is good policy when a repair part is ordered which has not been previously listed, to get the drawing or catalogue number from the invoice and put it on a specification card, as one object of this card is to have a convenient method of filing information for future reference. This usually requires considerable space, so cards or loose leaf sheets should be made large, some at least 12 by 14 inches.

Parts That Should Be Stocked

Good maintenance work requires that there should be stocked parts which are subject to wear or deterioration and are necessary for continued operation, but yet cannot be easily or quickly made in the local plant. Spare bearings are considered a necessity for important motors, but if ordered by motor numbers alone there would be considerable duplication as a slow speed motor of one size may take the same bearing as a high speed motor several times as large. There is the other condition where bearings are of the same general type and size but are not interchangeable due to different minor characteristics. It is therefore necessary to have specific information about each part which it is desired to stock. Spare windings and even spare motors are a necessity for continued operation but are difficult for many electrical departments to obtain. A spare winding is preferable to a spare motor when the latter is special or where there is only one of that particular type and speed, if, as it is frequently possible, that particular motor can be shut down for a time to be rewound, but could not remain down long enough to get a new winding from the factory. In such cases a spare winding requires less investment than a spare motor and may be nearly as effective, especially as many motors can be rewound in less than twenty-four hours. For other motors a spare winding is useless because there would not be time to wait for its installation and so spare motors must be provided. With belt drives spare motors are the cheaper proposition, because even if the spare is not of exact size and speed wanted it can generally be used, at least temporarily. It is with direct connected motors that special difficulty is encountered. In figuring out the need of either spare windings or spare motors, study each individual case; estimate the effect of a breakdown and then, if of sufficient importance, plan on having a spare motor or a (complete or part) spare winding as the case warrants. There is a sequence of operation, such that even a small breakdown may have disastrous consequences and the need of spare equipment is obvious if one is to secure the continuity of service so essential to a paper mill.

The efficiency and power factor guarantees listed in the specification form are important for making power tests of motors. From a depreciation point of view there is no economy in running underloaded motors because up to a certain temperature the insulation deteriorates practically as fast with low temperature as it does with high. Underloaded motors are a loss through increased investment, lower efficiency and lower power factor. Power measuring instruments are therefore necessary for a proper maintenance program. It frequently happens that a complete set of instruments can be paid for in a comparatively short time through detecting underloaded motors. For example, there may be a case where a 100 hp. motor is carrying a 75 hp. load and, when in need of a 100 hp. motor a 75 hp. motor can be purchased and the substitution made, thereby going a long way towards paying for the instru-

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ments. This is not an uncommon occurrence, because there is a tendency to play safe in recommending the motor sizes for machines.

Possibility of Going to Extremes

In these days of agitation for high efficiency there is, however, the possibility of going to extremes and sacrificing reliability for efficiency. Reliability of operation is of supreme importance because when a motor breaks down its efficiency is zero and even though its operating efficiency may be high it will be more than offset by a few breakdowns. With a constant load, motors may be loaded up to the safe operating temperature, but with variable load it is a more difficult matter. This may be illustrated by a pump taking a normal load of 75 hp., but for a few minutes at a time taking 100 hp. From a heating standpoint a 75 hp. motor would be sufficient, but the overload relays will have to be set at approximately 110 hp. to take care of the maximum load which is 47 per cent overload for the 75 hp. motor. This is too wide a margin for single rated motors and the extra investment for a 100 hp. motor would be offset by a new winding if the 75 hp. motor burnt out due to lack of proper overload protection, to say nothing of the loss of production. In some cases there would be a loss in efficiency and lower power factor in using the larger motor, but it is also frequently possible that the larger motor may be more efficient at the part load than the smaller motor at full load. There can be no set rule for the proper application of motors as each case really involves individual study to get unit as well as overall plant efficiency. There is, however, one important principle in the selection of apparatus from a maintenance point of view, and that is to standardize as much as possible, all things considered, on one manufacturer's line. When buying machines with which motors are to be supplied, it is good practice to specify that motors shall be supplied of same manufacture as are in general use around the plant, as this eliminates the carrying of extra parts and spare equipment.

The success of a maintenance program depends greatly on the men who are doing the actual work. We have on each shift a man whose duty it is to make periodic trips around to all the motors. Originally their idea was apparently to make as many trips as possible, looking over motors for any evident trouble, but their responsibility ceased if motors were running satisfactorily at the time. This attitude has been changed as they are now responsible for things that might happen which are within their power to prevent, as we depend on protecting motors from possible injury rather than on the chance that a motorman will happen to be on the spot when trouble occurs.

Causes of Motor Burnouts

The three principal causes of motor burnouts are, actual breakdown due to defective insulation, bearings burning out permitting rotor to rub on stator, and overloads. A well constructed motor is inherently a reliable piece of apparatus and most of its troubles are due to outside causes and it is therefore evident that all conditions affecting a motor should be considered.

In many locations it is practically impossible to keep motor windings clean, but ordinary dry dust does not necessarily injure winding, except by plugging the air ducts thereby reducing motor capacity. Oil, water and acid are, however, particularly undesirable and every effort should be made to prevent them from getting on windings. Oil is watched not only as to its coming from motor bearings, but it is liable to be thrown into the motor from belts, chains or gears. Pipes near motors must be watched for leaks; even if they are not where water or acid may directly strike the motor, they can do harm by the liquid striking the floor and spattering into it. Keeping motor windings in proper condition eliminates to a great extent this first source of trouble. Ordinary blowing out with compressed air is not sufficient, so besides cleaning, they should be painted with a good insulating varnish. Under ordinary service conditions motors should be completely taken apart at least every three to five years and if conditions are severe the interval should even be shortened to once a year. Some motors are difficult and expensive to disassemble, especially if in constant service, so when frequent painting is necessary the ends of coils can be painted using an air-gun at 20 to 25 lb. pressure. This gives quite effective results and the complete overhauling can be done at longer intervals. In paper mills there is always the danger of a motor getting flooded with stock or water and the painting of windings, by filling up pores and minute cracks in insulation, often prevents breakdowns from these causes. The air-gun is particularly useful because it enables the varnish to be sprayed between coils, and the whole exposed surface coated over.

Avoiding Bearing Troubles

Bearing troubles due to their own conditions are infrequent if kept properly filled with oil and free from grit, but may be caused by tight belts or crowding of shafting, and pump rotors. It is expected that whenever millwrights take up a belt, connected to a motor, the motormen will be notified so that they can watch the bearings for any undue heating. Bearing oil should be changed at definite intervals, at least once a year.

Overloads generally come from outside causes except when the motor runs single phase due to defective circuit connections. Proper overload protection will take care of overloaded conditions, and motormen are expected to check the operation of the overload relays frequently. There is a tendency when a motor is overloaded and blows fuses or frequently trips overload relays "to set 'em up higher" and take a chance, but this should only be done in emergency or under special conditions which warrant taking the chance, otherwise install a proper sized motor.

Motormen act as inspectors and do minor emergency repair work, but the greater part of the repair and inside inspection work is done by a regular repair crew. Whenever there is more than a one man crew, it pays to have certain work followed as much as possible by certain men who, by continued practice, will gain extra proficiency in their particular line. Inspection and repair work require men who can see beyond just the obvious things.

Chart System of Motor Inspection

Before we had systematic inspection motor starters gave trouble and were a source of annoyance and expense, especially if it occurred during the night shifts and had to be fixed by the motormen. Their work would be more or less hurried and not done well so that starters would frequently again give trouble, we therefore had the vicious circle of a trouble hurriedly fixed causing more trouble. To overcome this a chart or card system of motor and starter inspection was developed. Every other week was assigned for Motor Starter Inspections and certain men detailed to do this work. In deciding how often inspection was needed it was assumed that a starter, under ordinary service, should stand up at least for one year when started twice a day for 300 days or 600 times. With this as a basis it was estimated how many times each starter was expected to operate, and that number of times divided by the 600 is the number of times a year the starter is to be inspected. This is used only as a basis and is not strictly followed because some motors are only started once a week, which would be 52 times a year, but it was considered that any starter could afford at least one inspection a year. On the other hand, there are motors started a large number of times, even to 300 or 400 times a day. These gave considerable trouble when ordinary hand starters but with the magnetic switch type have given practically none. There seems to be a growing tendency to use magentic or remote control starters and eventually they will be nearly universally used, as they eliminate to a great extent the personal element in starting, as improperly started motors are a considerable source of trouble. Acid plants, blow pit rooms and such places offer an opportunity to put magnetic types of starters in a room by themselves out of reach of acid fumes, dust, etc. Our principal trouble with the magnetic type of

starter has been when someone "takes a swipe" at the push button with a pickaroon instead of using the hand to start and stop a motor.

Forms for Inspectors to Follow

Inspections include not only the contacts but the complete equipment, and in making inspections we have found it advisable to have forms for the inspector to follow. These eliminate any tendency to slight certain parts as it is required to check each part as being O. K. or otherwise.

It not only aids the inspector but after the desired information has been noted in the service record, inspection forms are sent to the motormen who are not very keen on having an inspector report things that they have overlooked.

On alternate weeks the general apparatus around the plant is inspected, such as station apparatus, transformers, etc. Previous to scheduling the inspection work it was customary to bring a large crew in each Sunday and the work was more or less haphazard. Some apparatus got too much attention and others were neglected altogether.

The service records show the results of inspections and overhauling. If it is found that between inspections apparatus gives trouble, their frequency is increased and vice-versa if generally found to be satisfactory. The keeping of minor records as fuses blowing and overloading relays tripping has enabled single phase running to be detected, as well as faults in the machines driven. When available we put down the name of the man who started the motor if it gives trouble by blowing fuses due to improper starting, especially as may happen in "jogging" to run on belts, etc. Continued trouble along that line enables us either to caution the man or to instruct him in the proper manner of handling starters. It is not uncommon to find men with the idea that they are helping a starter by operating it slowly.

When a motor is purchased the service record starts with a number and rating. When installed, the date, location and machine driven is recorded; ampere and voltage readings are taken, also air gap, pulley size, belt data and overload protection setting. Routine cleaning is not recorded but all inspections, overload tripping, and overhaulings are noted. It sometimes happens that when installed certain overload settings are made and later inspection reports show them changed. The service record is a check on what the original setting was so that there cannot be changes of adjustment without being detected. Service data is never destroyed because if a motor is changed to a new location a note is made to that effect and the record continued. It is not a difficult or time consuming record to keep because many motors give practically no trouble and only two or three entries may be made during a year's time.

Keeping the Work from Becoming Congested

We have found it a decided advantage to schedule inspection as it tends to keep the work from becoming congested. We have also found it an advantage to furnish simple written instructions on the care of apparatus. Many men find it difficult to apply themselves to a regular course of study, but will read instruction sheets and bulletins supplied by the local plant or by the apparatus manufacturers, as apparently they wish to get to the point quickly about apparatus in which they are interested.

Paper Mills with electric motor driven grinders, electric steam boilers and electric motor paper machine drives are fast becoming entirely dependent on electric power for their operation. One can read articles here and there about electrical maintenance work, but practice seems to vary so much, that, considering its importance, it would seem to be within the province of this Association to obtain data to more or less standardize record forms, and give recommendations as to proper upkeep of equipment.

Committee on Coated and Processed Papers

By Edwin Sutermeister, Chairman

At the meeting in April, 1923, it was decided that the work of the Committee on Coated and Processed Papers for the following year should include the two lines, Waxed Papers and Gummed Papers. It was thought that the work could be carried out best by organizing two subcommittees, and Raymond Hatch was asked to serve as chairman of the subcommittee on waxed papers, and Norman Clark of that on gummed papers.

Mr. Hatch made very careful inquiry among the manufacturers who were prominent in the waxed paper trade and found it impossible to persuade them to enter into questions of investigation or research in a co-operative way. He felt that any work done by the committee under such conditions would be done by one man and that the work would be accepted by all the rest of the industry without any reciprocal information. After considering the situation carefully it was thought best to abandon, temporarily at least, the attempt to carry on work along this line. This sub-committee was therefore allowed to die a natural death.

Mr. Clark appointed on his sub-committee George W. Sullivan of the Nashua Gummed and Coated Paper Company and George G. Richter of the Brown Company. Through a misunderstanding, Doctor Richter has done no work for this committee nor taken any part in the carrying out of its program. Mr. Sullivan has prepared a paper on the effect of acetic acid on animal glue, and this paper will be read and discussed later.

Although not on Mr. Clark's committee J. O. Ross has ably seconded its efforts by preparing a paper on the drying of gummed papers. This will also be read and discussed at the sectional meeting.

During the year the question of a possible substitute for casein was brought up by a member of the Technical Association. This has aroused considerable interest in the industry and it has been attempted through correspondence to find out who was interested to the extent of supporting the necessary investigations financially. No definite plans have yet been made and opinion seems to be divided as to whether the work should be done by the Bureau of Standards, in which case the results would be free for all to use, or whether it would be better to have it done in a private laboratory so that the results would benefit only those who finance the undertaking.

Chapter in Textbooks

The most important work carried out by the committee this year has been the preparation of the manuscript on Coated Papers for the textbooks. This work has been done almost entirely by Norman Clark.

Substitute for Casein

For the coming year it would seem well to organize for the investigation of possible casein substitutes and push the work along as fast as possible, for at best it will probably be a rather long investigation. It is hoped that more work relating to gummed papers can be undertaken as this should be a fruitful field for research. Another subject which is proposed is the manufacture and use of satin white. It would probably be quite difficult to obtain co-operation in this work for it is a field where there are supposed to be many secrets, but as there is practically nothing about it in the technical literature there is a good chance to fill a distinct want.

Chemistry of the Sulphite Process VI

Relative Effects of Temperature and of Acid Concentration During the Cooking

By R. N. Miller[1] and W. H. Swanson[2]

In an earlier paper of this series[3] it was shown that the part of the acid having the greatest influence upon the reaction was the part present as sulphurous acid, and that the concentration of this part adjusted itself automatically to the pressure and temperature maintained during the cook. The cooks reported in the present paper were made with the purpose of determining, first, the relative effects of temperature and of sulphurous acid concentration upon cooking time, and, secondly, the effects that could be produced by variation in temperature alone in a commercial system restricted

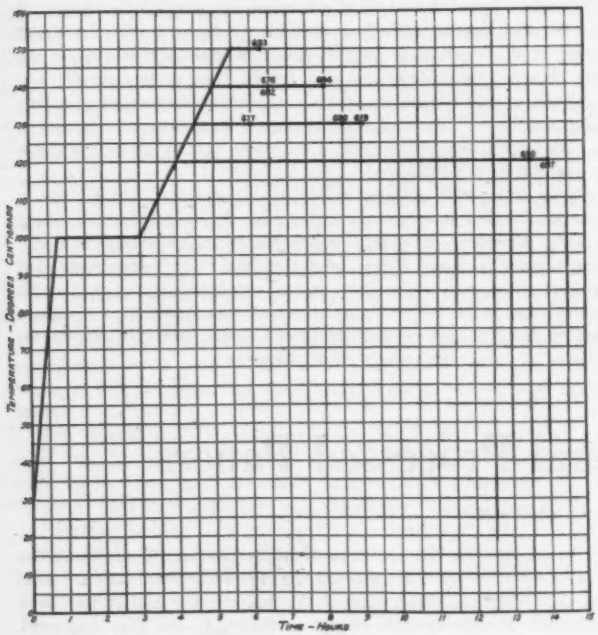

FIG. 1

as to length of cook and maximum pressure. The experiments thus fall naturally into two series, which will be referred to as the first and second groups.

Materials

The wood was white spruce from Wisconsin and Minnesota. The chips in the first group of cooks were passed through a swing-hammer shredder for reduction to a size that would be easily penetrated by the acid. Those in the second group were the usual chips of commercial practice, 5/8 in. long. All cooks were made on the equivalent of 85 lb. bone-dry wood.

The acid, 50 gal. of which were used in each cook, was made up from high-grade calcium hydrate lime and liquid sulphur dioxide. In each cook of the second group the gas from the preceding cook was recovered and used, the acid being brought up to strength with liquid sulphur dioxide. In the first group of cooks no gas was recovered.

The cooks in the first group were made with indirect steam by means of the heating coil, so as to avoid the variable of dilution. There was no relief permitted, the pressure being allowed to go as high as it would.

In this group the temperature was raised rapidly to 100° C. and held there until the third hour. From that point the temperature was raised at the rate of 20° C. per hour to the maximum desired and held there to the finish. Fig. 1 shows a typical cooking curve. All cooks except 677 were blown when the base was shown by the Sander determination to be exhausted.

Results and Discussion

In Table 1 are given the data for the first group.[4] In the use of the terms shown in the headings, "pulp" is in all cases applied to the fibrous product after screening. "Cellulose" is used only as the name of the material obtained as a residue after the application of the Cross and Bevan method of isolation as modified by Schorger.[5]

The rate of heating above 100° C. (20° C. per hour up to the maximum temperature) was selected after a number of preliminary trials. It was found that the rate at which it was possible to heat the digester depended in part upon the concentration of excess sulphur dioxide in the acid. An acid with a high excess could be

TABLE 1—COOKING CONDITIONS, YIELD AND ANALYTICAL RESULTS FOR GROUP I

Cook No.	Length of cook hr.	Maximum temp. °C.	Yield screened pulp, oven dry %	Yield cellulose %	Lignin in pulp %	Cellulose in pulp %	Excess SO_2 concentration %
683	6¼	150	46.1	41.7	5.8	90.5	1.65
684	8	140	52.0	46.5	6.2	89.3	1.51
676	6½	140	46.1	44.1	2.2	95.7	2.50
682	6½	140	46.7	44.7	1.1	95.7	3.58
680	8½	130	48.8	46.6	1.6	95.4	3.70
678	9	130	48.3	45.2	2.6	93.6	2.55
677	6	130	61.7	47.6	16.5	77.0	2.50
687	14	120	46.8	43.4	4.8	92.7	2.75
690	13½	120	47.9	45.0	4.4	93.8	3.65

heated much faster than one with low excess without burning an abnormal quantity of chips, the higher concentration of excess sulphur dioxide evidently being favorable to rapid penetration of the chips by the base.

It is interesting to note that after the maximum temperature was reached the pressure remained quite constant, and that during this period the concentration of excess sulphur dioxide in the liquor was also constant. The same condition has been noted in commercial cooks extending over long periods during which the temperature was low enough to make relief unnecessary. The excess sulphur dioxide content of the liquor remains constant under these conditions although the cooking is proceeding steadily.

The magnitude of the effect of temperature on the rate of cooking becomes clearly apparent upon examination of the conditions in cooks 690, 680 and 682. In these the concentration of excess sulphur dioxide is fairly constant, but as the temperature is increased in 10° increments the length of the cooks decreases from 13½ to 8½ to 6½ hours. Contrasted with this is the group of cooks 684, 676 and 682, all at 140° C., but with excess sulphurous acid concentrations of 1.51 per cent, 2.50 per cent and 3.58 per cent, respectively. In these the change in length of cook is not apparent at all except in the case of the 1.51 per cent excess concentration, and even there the increase is only 1½ hours. In this case, however, the purification is not so great, and the lengthening of the cooking

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[3]PAPER TRADE JOURNAL, Vol. 77, No. 15, Oct. 11, 1923.
[4]Chemical Analysis of Pulps, by M. W. Bray and J. W. Natwick.
[5]A. W. Schorger, J. Ind. & Eng. Chem., Vol. 9, No. 6, p. 556 (1917).

time would be greater if purification could be secured without ruining the pulp. In comparing cooks 678 and 680, made with different concentrations of excess sulphur dioxide at 130° C., and cooks 687 and 690, with different concentrations at 120° C., the same relation is seen, namely, that increase in concentration at the same temperature does not materially change the length of cook, but that with the same concentration a difference of temperature results in a marked change in cooking time, the cook shortening materially with increased temperature.

It should be noted, however, that if the same degree of purity had been obtained in these cooks the contrast between the effects of temperature and of acid concentration would not be so great, especially when low and fairly high concentrations of excess sulphur dioxide are compared at fairly high temperatures.

The concentrations of excess sulphur dioxide in commercial practice are in general above 1.5 per cent at the start of the cook; in such cooks, therefore, closer parallelism between the effects of temperature and of acid concentration might be expected were it not for the fact that these high concentrations are uniformly accompanied by low temperatures, at which the effect of increased concentration on the rate of cooking is small. This case is exemplified in cooks 687 and 690. In other words, the conditions of commercial cooking serve to counteract in some degree the influence of acid concentration upon the rate of cooking and leave the temperature the dominant factor. The beneficial effect of high concentration on the penetration of the wood remains, however. It is further apparent upon examining cooks 690, 680 and 682 that with the same acid concentration the temperature interval between 120° C. and 130° C. produces a greater change in the rate of cooking than the interval between 130° and 140° C. The same relation is seen in cooks 687, 678 and 676, not being greatly altered by the lower concentration of acid in the three latter.

The situation can be summed up in the statement that the time of cook is greatly influenced by temperature and less influenced by concentration of excess sulphur dioxide, when the excess is fairly high; but that a change in concentration from low to fairly high can exert a considerable influence, especially at high temperatures.

When considered with reference to the purity of pulp the figures in this group do not show as clear-cut relations as might be desired. Because the pulps are all pretty well cooked the variations are so small as to approach the experimental error, though a tendency toward less purification in the case of both the weaker acid and the lower temperature will perhaps be noted.

The yield of both pulp and cellulose likewise show too little variation to permit the drawing of well substantiated conclusions. It is really remarkable that so much difference in cooking conditions should produce so nearly the same yields. The tendency is toward a reduction in yield of cellulose by high temperature for equal degrees of purification, but, as shown by cooks 687 and 690, 678 and 680, 676 and 682, considered in pairs, a greater purification at the same temperature is secured with stronger acid without sacrifice of cellulose. In fact, the slightly shorter cooking time with the stronger acid may account for a slightly greater yield of cellulose. The smallest yield of cellulose is obtained in cook 683, made at 150° C. with 1.50 per cent excess sulphur dioxide in 6¼ hours.

Cook 677, the duplicate of 678 but blown prematurely at the sixth hour, affords an interesting confirmation of results and opinion recorded in earlier publications to the effect that at low temperatures cellulose is lost rapidly in both sulphite and alkali cooking at the very beginning.[8] In cook 677 the yield of cellulose on the basis of the wood at the sixth hour is only 2.4 per cent greater than that in cook 678. Hence, it appears that the activity for the last three hours of cook 678 must have been directed mostly toward lignin removal.

[8]Bray and Andrews, PAPER TRADE JOURNAL, Vol. 76, No. 3, p. 49, Jan. 18, 1923.

The pulps of this group, although the cooking conditions were abnormal and not comparable to commercial methods, were all of about average quick-cook quality as regards strength; the fact that they were not handled after approved commercial methods does not prevent the application of the information gained.

Application

In the paper referred to at the beginning of this article it has been shown that at any pressure and temperature the concentration of sulphurous acid is automatically fixed. The problem which confronts every sulphite mill operator is the adjustment of his equipment to conform to both the physical laws underlying the process and the economic environment in which he must operate. In view of this problem the second group of cooks was made in order to determine how the relations between temperature and acid concentration as found in the first group would apply in an arbitrarily selected system similar to that of a commercial plant.

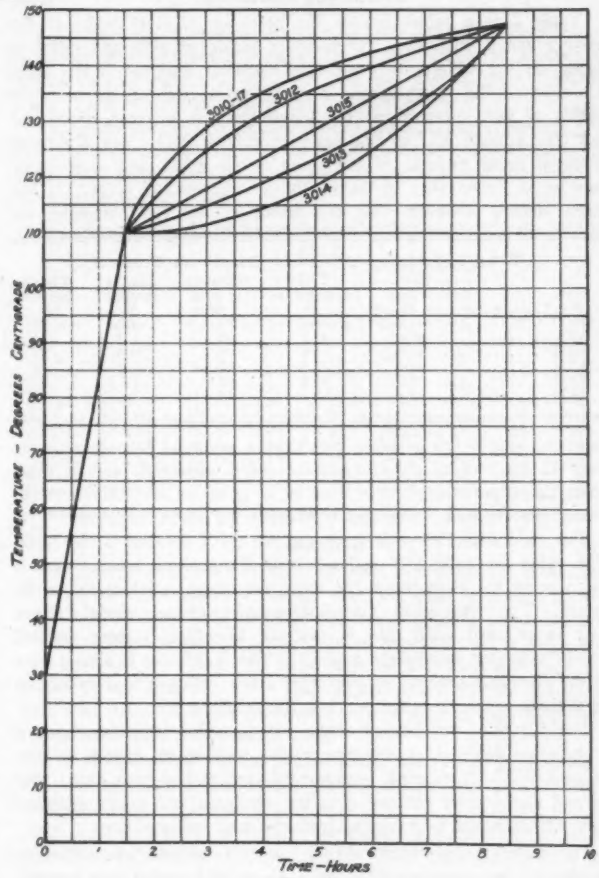

FIG. 2

It was assumed that a maximum cooking time of 8½ hours was made necessary by the production schedule of the mill and that the digester pressure was limited to 75 pounds per square inch. The temperatures of 110° C. at the end of 1½ hours and a maximum of 148° C. at the finish of the cook were selected arbitrarily as being commercially possible. The acid used contained 5.50 per cent total sulphur dioxide and 1.20 per cent combined sulphur dioxide. In each cook the acid contained the gaseous but not the liquid relief from a previous cook.

In a system restricted as above the problem then becomes that of selecting the most advantageous temperature curve between 110° C and 148° C. The curve selected must be of one of the following

types: (1) A uniform rise from 110° C. to the maximum; (2) rapid rise from 110° C. followed by a slow rise near the maximum; or (3) a slow rise from 110° C. ending in a rapid rise to the maximum. The three types of curve are shown in the chart, Fig. 2.

For the cooking, direct steam and side relief were used in all cases with top relief after 135° C. The last fifteen minutes of each cook was employed in relieving the pressure from 75 pounds down to about 40 pounds before blowing off the digester. In the case of cook 3010 the blow-off came at the end of 7¼ hours; cook 3017 was made to show the effect of carrying the cook on the same type of curve to the time limit of 8½ hours.

Results and Discussion

Table 2 is a tabulation of the data for all the cooks of the second group, including bleachability, yields of pulp and cellulose based on the weight of wood, and chemical analysis of the pulp. Considering the values given, a variation is easily apparent. The yields of pulp increase, as the temperature is lowered, from 44.7 per cent in cook 3017 to 52.8 per cent in cook 3014. The difference between cooks midway of the series is not great, and such variation as is shown may be the result of experimental error. It has been shown, however, that one factor in the yield, namely, the

TABLE 2—YIELD AND ANALYTICAL RESULT FOR GROUP II

Cook No.	Yield of pulp %	Yield of cellulose %	Cellulose in pulp %	Lignin in pulp %	Bleach required %
3,017	44.7	44.2	98.3	1.9	30
3,010	46.6	45.5	97.4	1.3	18
3,012	47.0	46.4	98.7	0.9	26
3,015	48.8	46.5	95.5	1.6	14
3,013	48.6	45.0	92.5	2.5	14
3,014	52.8	47.2	89.3	5.6	30

cellulose approaches a value indicating a point of relative stability near 45 per cent at the temperatures here employed; and in these cases the experimental error may be as great as the difference between the cellulose yield and that value for stable cellulose.

The yield of cellulose is shown in the third column of the table. The value for cook 3017 indicates that the cooking was so drastic as to bring the yield below the value for stable cellulose to be expected. The other cooks give yields equal to or only slightly above that value until cook 3014 is reached, in which a more marked excess indicates incomplete cooking. This condition is shown also in the chemical analysis of the pulp, a low cellulose and relatively high lignin content indicating less purification.

The degree of purification of the pulps as thus indicated shows a progressive decrease as the temperature is lowered, except in case of cook 3017. This cook was burned, and it has been noted that burned cooks upon analysis give higher lignin and lower cellulose values than would be expected from the cooking conditions.[1]

The bleach requirement of the pulps is included as affording an idea of their commercial utility. Cook 3017, which was burned, and cook 3012, slightly burned, show a high consumption. Cook 3014 also shows high consumption, as was to be expected from its being undercooked. The others bleached easily.

The strength values of the pulps, shown in Table 3, are very interesting. It is apparent at once that cook 3017, which was burned, is the poorest pulp, its strength values being consistently lower than those of any other. Cook 3012, which was slightly burned, gives evidence also of being overcooked. Cook 3010 is next in order of strength. Its numerical values are about the same as those of the average quick-cook sulphite, and it is to be observed that its values for tearing resistance are the highest in the group. Cook 3015 under all tests gives values that are equal to, and in the case of the folds, superior to the best quick-cook sulphite. Cook 3013 is the best pulp of the series. The strength is, in general, superior to the best Mitscherlich sulphites of which the Forest Products Laboratory has record, and in beating qualities it resembles that grade closely. Cook 3014, while of good strength, is not so good in natural color as cook 3013, nor is it an easy-bleaching pulp. It is of the type of the usual so-called hard stock, but generally superior to it. It would be very satisfactory for wrapping papers or news.

The series as a whole shows very clearly the possibilities of variation in pulp yield and quality in a sulphite mill by variation in temperature and the resultant variations in acid concentration. The conditions, except perhaps the length of time used to reach 110° C. are all attainable in the average sulphite mill. By reaching this temperature one hour later and carrying out the process the rest of the way as in the laboratory cooks, any sulphite mill has at its command the whole range of variation shown in this series.

It was suggested in the first part of this paper that restricted conditions in the ordinary commercial cook would serve to counteract the effect of high concentrations of acid at the start of a cook and make temperature the dominant factor. It can be seen that there is a tendency in this direction in the second group. Despite the lower temperature of cook 3013 as compared with cooks 3015 and 3012 and the consequently stronger acid (Table 4) resulting from lessened relief, neither an increased yield of cellulose nor better purification is obtained; nor does cook 3015 show an improvement over cook 3012. The lower temperature rather dominates, and there results a less degree of purification without increase in cellulose yield but with slightly higher pulp yield. In the case of

TABLE 4—TEMPERATURE AND ACID ANALYSIS DURING THE COOK, GROUP II

	Fifth hour					Seventh hour				
Cook No.	Temp. °C.	Total SO_2 %	Free SO_2 %	Combined SO_2 %	Excess SO_2 %	Temp. °C.	Total SO_2 %	Free SO_2 %	Combined SO_2 %	Excess SO_2 %
3,010	140	1.65	1.36	.64	.72	145	.92	.90	.02	.89
3,012	137	2.50	1.78	.72	1.06	143	1.46	1.20	.26	.94
3,015	128	3.02	2.44	.58	1.86	135	1.59	1.25	.34	.91
3,013	123	3.31	2.67	.64	2.03	133	3.02	2.52	.50	1.02
3,014	119	3.21	2.59	.62	1.93	130	2.73	2.29	.44	1.85
3,017	141	1.81	1.26	.65	.61	145	.93	.76	.17	.59

cook 3014 the increase in cellulose yield is the result of the least purification, the high acid concentration in the early part of the cook not having compensated for the lower temperature. Cook 3010, with lower acid concentration as a result of faster relief, shows good purification but in a much shorter cook, and the cellulose yield has been brought down by higher temperature. Moreover, the strength is only fair. Cook 3017 shows a decrease in cellulose yield resulting from prolonged higher temperature, the effect that would have been produced in cook 3010 if it had been carried the full time.

In such a series as this, then, in which concentration of the acid is controlled by the pressure and temperature, the least rise of temperature which will produce the requisite degree of purity will produce the best all-around pulp.

[1] Bray and Andrews, loc. cit.

TABLE 3—STRENGTH OF PULPS, GROUP II

(Numbers at top of columns refer to minutes in ball mill)

	Bursting strength				Tensile strength				Double folds				Tearing strength			
Cook	20	40	60	80	20	40	60	80	20	40	60	80	20	40	60	80
	Pt./lb./ream				Breaking length Meters				Number				Grams/lb./ream			
3,017	0.43	0.48	0.50	0.48	1,940	2,285	1,800	1,725	55	100	116	69	1.55	1.61	1.67	1.53
3,010	0.65	0.76	0.76	0.77	3,125	3,175	2,995	2,860	870	1,030	1,886	1,096	2.59	2.24	2.55	2.31
3,012	0.55	0.65	0.72	0.74	2,377	2,667	2,900	2,760	367	525	747	495	2.01	2.11	2.34	1.86
3,015	0.67	0.76	0.97	1.03	3,560	4,205	3,810	2,700	1,710	5,129	2,931	1,650	2.09	2.17	1.98	2.07
3,013	0.91	0.99	1.06	1.30	4,755	3,675	3,785	4,540	2,778	2,177	1,724	2,197	1.84	1.94	2.41	1.87
3,014	0.96	1.04	1.20	1.15	4,940	4,182	4,432	3,202	2,217	1,967	3,172	1,712	1.91	2.04	1.66	2.19

Summary

Temperature has greater influence on the progress of the reaction than has acid concentration. Changes in temperature that are commercially possible are of greater influence than any acid concentration changes within the ordinary range of commercial practice.

In the usual process of cooking the relations between pressure, temperature, and acid concentrations are such that the beneficial effect of increases in acid concentration are largely offset by pressure and temperature limitations, so that temperature is left as the dominant factor in controlling the progress of the reaction.

The lowest average temperature that will give the requisite purification in the necessary length of cook will produce the best quality of pulp.

Comparative Efficiency of Pulp Grinders

W. A. Munro*

Considerable discussion has taken place during some few years past concerning the relative merits of the new Voith magazine type grinder and the older or pocket type. These discussions have created considerable interest in grinders and each type has its ardent supporters and satisfied users who are not backward in pushing forth the claims of their favored type. The Groundwood Committee for the past year has been endeavoring to secure as much data as it possibly could concerning the different types and their performance, and has been able to obtain a considerable body of valuable information on such points as hp. per ton, labor cost per ton, tons per stone per unit time, etc. This information we have tabulated and classified so that the salient features can be recognized at once. We have also secured samples of paper made from each type of grinder as we feel that the fact that one mill may use 60 hp. per ton with a certain type of grinder should not be used as an argument for or against that grinder or a basis of comparison with another type unless the running conditions in the mill, such as speed, per cent of sulphite, etc., and the quality of the finished product are taken into consideration with the horsepower figure.

Little Difference in Quality of Paper

We have found that there is but little difference in the quality of paper made of pulp from different types of grinders. We have found as great or a greater difference in the paper made by two different mills both using pocket grinders as we have in the paper made by two other mills, one using pocket grinders and the other using magazine grinders.

If freeness testing had gone ahead to such an extent that it would be possible to standardize groundwood, the matter of comparison would then be much simpler, but with the freeness tester of such value that it can be used only in one mill or a small group of mills where white water conditions are about the same, another basis of values must be taken.

The committee has been in touch with practically every large newsprint mill in the United States and Canada. We have selected twelve representative mills and tabulated the returns from them. We have not listed the initial price of any of the equipment as the prices vary so according to the year of installation that they would be practically valueless. I might say that a magazine grinder at present would cost very nearly $1,000 per ton of pulp produced while a pocket grinder would cost but $300 per ton.

The magazine type of grinder makes a much better looking mill than the pocket type. There is an almost total absence of steam, the walls and floor are free from pulp spatterings and all wood is handled on an upper floor.

*Member TAPPI, Washington Pulp & Paper Corp., Port Angeles, Wash.

TABLE

Type of grinder	Size of stone	Tons per stone	Power per ton-hp.	Labor cost per ton	Paper machine: Speed, f.p.m.	Paper machine: Efficiency, %	Paper machine: Sulphite, %	Strength, points
3-pocket..	27 x 54	6.5	65	$1.85	640	89	28	8
3-pocket..	27 x 54	6.0	61	1.54	480	92	16	9-10
3-pocket..	27 x 60	7.0	66	1.16	600	90	22	10
3-pocket..	27 x 54	7.5	52	.90	645	92	20	9
3-pocket..	36 x 54	10	62	.85	680	88	28	10
4-pocket..	27 x 60	10	56	.72	560	90	23	9
3-pocket..	54 x 54	15	54	.56	1000	94	22	10
Magazine	54 x 67	20	68	.70	660	93	30	8.5
Magazine	54 x 67	20	65	.77	560	90	23	10
Magazine	54 x 67	18	67	.68	700	86	24	8
Magazine	54 x 67	17	70	.72	1000	92	26	8.5

Conclusion

The magazine grinder using 4 ft. wood is much more economical in labor cost per ton over the three-pocket type of pocket grinder on 2 ft. wood producing less than 7½ tons to a stone per 24 hr. The saving in labor over this 2-foot type is so much that it more than over-balances the increased stone cost of the magazine type and higher power cost per ton. This higher power cost is due to the fact that more power is required on the magazine type to grind a ton of pulp than in the pocket type.

The difference in costs is not so great and rapidly disappears as the size and production of the pocket grinder increases. With a production over 7½ tons to a stone and up to 10 tons there is but little difference in the labor cost, the higher labor cost of the pocket grinder being largely offset by greater initial cost, higher stone and power costs of the magazine type. Over 10 tons to a stone the larger type of pocket grinder is more economical in every way than the magazine type.

Report of Materials Testing Committee

By Helen U. Kiely, Chairman

During the past year the Materials Testing Committee has assembled and had published for the first time standard methods covering the more common materials tested in the ordinary paper laboratory.

These methods are in all instances the practical commercial methods and are in daily use in many laboratories. While it is realized that these might not meet with the approval of the highly scientific, it was thought better to prepare such methods as would best suit the needs of the ordinary paper mill chemist. For college laboratories or for referee analysis a more detailed method might be more advisable.

This edition of the Materials Testing Methods is in no way complete or final. It is the hope of the Committee that from this first attempt many valuable criticisms and suggestions will be forthcoming and a more complete and improved edition printed.

The Committee will continue to assemble and check new methods during the year. It is hoped that a revised method for pulp testing may be developed, as there seems to be a growing need for a new method that may better approximate mill working conditions.

No data seems to be available on the testing of rags and it is also hoped that something may be worked up along this line.

If there are any particular methods which the members desire the committee to investigate they should be brought to the attention of the committee and consideration will be given them.

"Methods in Use for Disposal of Lime Sludge and Sulphate Pulp Mills"

By G. K. Spence*

For some years past soda and sulphate pulp manufacturers have been confronted with the problem of disposal of lime sludge from the causticizing process. When compelled to discontinue dumping the lime sludge into the streams many were forced to take hurried steps to dispose of it. The first step was to pump the sludge to large sedimentation basins, which were open fields banked up on all sides, in which the lime was permitted to settle and the clear solution from the top passed to the stream. This was an expensive means of disposal, especially where ground was scarce, as one can readily understand how soon these basins would fill up and necessitate raising the walls or increasing the area of ground covered.

With the advent of filter presses for washing the soda from the sludges, and thus increase the capacity of the alkali-room, and decrease the loss of soda, the pulp manufacturer was attracted to other methods for disposing of the lime sludge.

The lime cake from the filter press contains from 40 to 50 per cent water, and the most natural conclusion is that it is in proper condition to be readily dried and marketed for agricultural purposes. A number of manufacturers installed rotary driers, using coke as fuel, dried this lime, put it up in bags and marketed it under the name of precipitated or agricultural lime. The market for agricultural lime is seasonal and there are times when it is impossible to dispose of it, and the manufacturer is compelled to revert to his old method of disposal.

Even when the market will absorb the agricultural lime it is about a break-even proposition, and if it is necessary to store any, it is always rehandled at a loss.

Knowing that whiting would bring a higher price than agricultural lime some manufacturers made the necessary installation to produce this commodity from reclaimed lime sludge. As the trade requires a very clean product, free from caustic alkali, and of an extremely fine state of subdivision, it requires an elaborate installation to produce material which will meet the requirements.

Lime sludge from the causticizing operation contains about 8 per cent unspent lime or calcium hydrate and it is necessary to carbonate this which was usually done in CO_2 towers, and even then it was a difficult matter to keep the caustic alkalinity under 5 per cent.

The lime after passing through the driers was ground and bolted or air-floated in order to bring it to the required state of subdivision. There is only a differential of about $4 per ton between the selling price of agricultural lime and whiting, which difference is mostly absorbed by the over-head on extra installation, extra labor, etc., necessary to prepare the material to meet the requirements of the trade.

The whiting market is also very uncertain and as in the case of agricultural lime, the manufacturer is compelled at times to resort to the sedimentation method of disposal or if allowable, pass the sludge to the stream, until the market is again ready to absorb the whiting.

When confronted with the problem of finding a steady market for disposal of agricultural lime or whiting, the manufacturer was compelled to investigate the practibility of reburning the lime sludge and using the reclaimed caustic lime to causticize soda in his own process. Those who have studied this problem are unanimous in their conclusion that reburning is the most feasable method of disposal. By this installation the manufacturer can realize a greater return on his investment and at the same time furnish his own stable market for disposal of the reburned lime, which he uses right over again in his own operating system. In fact this method of disposal has appealed so strongly to the pulp manufacturers that, regardless of the large amount of money invested in agricultural lime and whiting plants, almost every one has been junked, and conversion made into installations for reburning lime.

The writer has had experience with all three systems and in order to familiarize those interested in lime sludge disposal with steps taken a rough outline of each is here given:

Agricultural Lime

No extra care is necessary in preparing the lime sludge before passing same to the agitated receiving tank for the filter press. Either the continuous or batch type filter press may be used when washing the lime sludge, but care should be exercised to see that the soda is well washed from the cake before discharging it from the press. This can be better controlled by use of the batch filter.

The cake discharged from the press is passed through a rotary dryer 32 ft. long by 4½ ft. in diameter, the heat being furnished by burning coke, producer gas, or natural gas in the fire box. The dried lime is discharged into a larger dust chamber at the back of the rotary dryer, and carried by a screw conveyor to the bucket elevator, by means, of which it is discharged into the hopper supplying the bagging machine. Draught on the rotary drier is induced by means of a fan, and the air containing some fine dust is forced through a dry dust-collector, and thence through a stack provided with sprays to prevent fine dust from passing to the atmosphere. In some mills a special dust collecting device, such as the Dracco, Clark or Sly is installed. An Urschel-Bates valve bag packer is usually employed to pack the material for market. Following is a rough estimate of the installation cost, and daily operating cost of a plant for the manufacture of 50 tons of agricultural lime per day.

Installation cost, $65,000.	Daily operating cost
Interest and depreciation, 15% (325 days)	$30
Fuel for drying (coke)	70
Power	17
Labor	80
Valve bags	100
Repairs and office	25
	$322

Production cost per ton $6.44.

Agricultural lime will sell for about $7.50 per ton f.o.b. mill, but as it is necessary to pay 50c to $1.00 per ton to a fertilizer company for marketing the lime the margin of profit is very small, provided the market would absorb the lime as fast as it is manufactured, but as it is seasonal and unsteady at all times, it requires more or less storage and rehandling means a loss.

Whiting

In order to prepare the sludges for whiting it is necessary to remove all traces of black ash, and to carbonate all of the caustic lime before sending it to the filter press. The caustic alkalinity is usually removed by passing the sludge through CO_2 towers, the CO_2 being produced by burning limestone.

When manufacturing whiting it is next to impossible to obtain satisfactory results by use of continuous filters. The composition of the whiting must be controlled so closely that in order to procure the desired results it is advisable to use batch filters. Care must be exercised in passing the pressed cake to the rotary driers, as the feed must be uniform in order to insure proper drying results. It is a more expensive operation to dry whiting than agricultural lime. It must be dried either with indirect heat or natural gas. Any

*Member TAPPI. New York and Pennsylvania Co., Johnsonburg, Pa.

other means of drying tends to darken the finished product. The temperature must also be controlled very closely in order to completely dry and at the same time prevent burning some of the product to the oxide.

The equipment for inducing the draught and removal of dust from the escaping gases is practically the same as when manufacturing agricultural lime.

After passing the rotary drier it is necessary to grind the whiting and bolt it through a 200 mesh cloth, or grind and airfloat it in order to bring the product to the desired state of subdivision. This requires extra equipment and labor. It is necessary to have two forms of packers in order to comply with trade requirements; one being the open mouth bag packer for cloth bags, and the other the Urschel-Bates valve bag packer for paper bags.

Following is a rough estimate of installation cost and daily operating cost when manufacturing 50 tons of whiting per day.

Installation cost, $120,000.	Daily operating cost
Interest and depreciation, 15% (325 days)	$56
Fuel for drying (natural gas)	100
Power	30
Labor	135
Valve bags	100
Repairs and office	35
	$456

Production cost per ton $9.12.

The selling price of whiting varies from $11.50 to $12.00 per ton f.o.b. mill, but as it is necessary to pay a commission of 10 per cent for marketing the commodity, the manufacturer receives about $10.50 per ton for whiting when the market will absorb it as fast as it is produced. This will leave a profit of a little less than $1.50 per ton, if it is not necessary to re-handle the whiting; but if it is necessary to haul it to a warehouse, store and rehandle it when the market will absorb it, the necessary expense of rehandling will almost balance the margin of profit.

A lime reburning plant using producer gas for heat supply, is a slightly more expensive installation, but the return on the investment is so much more satisfactory, that it requires very little investigation to decide in favor of this equipment.

There is no previous treatment of the sludge necessary, it being pumped direct from the alkali room to the supply tank for the press. A continuous filter should be used, as it requires less attention and uniformly washed material is not essential.

The cake from the filter is discharged into the rotary furnace, which is from 100 to 120 ft. in length and 7 ft. in diameter, lined with fire brick. Producer gas is burned in the fire box.

In this process the burned lime is discharged at the fire box end of the rotary, while in the other two processes the dried lime is discharged at the opposite end.

The burned lime is either discharged into cars and hauled by hand to the alkali room, or conveyed to a causticizing tank in the lime burning room, where the carbonate liquor is causticized and pumped to settling tanks in the alkali room.

Following is a rough estimate of installation cost and daily operating cost of a plant for reburning 35 tons of lime per day:

Cost of installation, $130,000.	Daily operating cost
Interest and depreciation, 15% (325 days)	$60.00
Coal for gas producer	87.50
Power	22.00
Labor	50.00
Repairs and office	15.00
	$234.50

Reclaiming cost per ton $6.70.

This estimate is based on coal at $5 per ton at the plant, and burning two tons of lime per ton of coal. With this installation it is possible to reclaim 85 to 90 per cent of the lime used.

Powdered coal has been tried for furnishing the heat required for reburning the lime, and while this method will increase the burning efficiency, there is not the necessary data at hand to determine whether the accumulation of dirt in the lime from the ash in the coal is of sufficient detriment to condemn its use.

A pulp manufacturer, who is paying more than $8 per ton for his lime at the mill, and not over $5 per ton for coal, will show a nice profit from an installation for reburning lime for his own use, and at the same time discontinue the practice of discharging the lime sludge into the stream.

A Measure of the Color Characteristics of White Papers

By R. E. Lofton*

Paper, or other material, is said to be white if it reflects light nearly or quite non-selectively and also reflects a large proportion of the light falling upon it. It is common experience, however, that there is a wide variation in the tints of so-called white paper. The Bureau of Standards has measured the departure from true white of 21 commercial papers, including newsprint, printing, book, writing, bond and ledger.

Attempt was at first made to measure the departure from true white of each paper by using a single reflection of white light from the paper, as is done in grading or matching papers for color by the unaided eye; but this method was soon abandoned because the departure of the color of the paper from true white was usually less than the error made in setting the scale on the colorimeter.

A colorimeter constructed on the principles formulated by A. H. Pfund, which makes use of more than three reflections from the paper, was then tried. It is obvious that the color characteristics of a paper will be much more apparent upon the examination of a ray of light reflected three times from its surface than if the ray has been reflected but once. This colorimeter facilitates the comparison of two beams of light having a common source, one beam having been reflected between three and four times from the surface of the paper, and the other beam coming from the source unchanged. The two beams will appear exactly alike when viewed in the divided field of a photometer if there has been no change in the beam of light reflected by the paper.

*Associate physicist, Bureau of Standards.

In practice, the paper is tested for its brightness, or reflecting power, for three colors, or wave lengths, of light: red (625 m. wave-length), green (550 m. wave-length), and blue (460 m. wave-length). This is done by inserting consecutively into the ocular tube of the photometer three light filters having the dominant transmission as given above and matching the two beams of light for brightness for each color. A graph of the color characteristics of the paper may then be made, using its brightness for the three colors to form the vertical axis and the given colors or wave-lengths to form the horizontal axis.

Of the 21 papers tested, it was found that all were more or less deficient in the proportion of blue light reflected, and also that all were deficient, but to a smaller degree, in the proportion of green light reflected.

The 21 papers were also matched for color by unaided eye observation by 17 individuals experienced in color work. There was practically no agreement, however, among the 17 individuals as to the "whiteness" of the various papers. The accuracy of this colorimeter is from two to five times that of the unaided eye, as shown during this investigation.

It may be stated, in conclusion, that practically all, and perhaps absolutely all, commercial white papers depart from true white, in that they do not reflect all the components of white light in the same ratio, reflecting less blue light than green, and less green than red.

Turbines vs. Motor Generators

By F. O. White*

If a paper machine is to be equipped with a sectionalized electric drive, what type of prime mover should be installed to drive the special generator usually required? Should a steam engine, a steam turbine, or a motor be used?

The answer to these questions can be found only after a consideration of the amount of power required to drive the paper machine, the quantity of steam required to dry the paper, the cost of coal, the price of electric power and the installation costs. As between the steam engine and the steam turbine there is but little question as to the choice for the service. Economy of space, freedom from oil in the exhaust steam, and high speeds suitable for generator operation all make the turbine the more desirable prime mover even if its first cost should be higher.

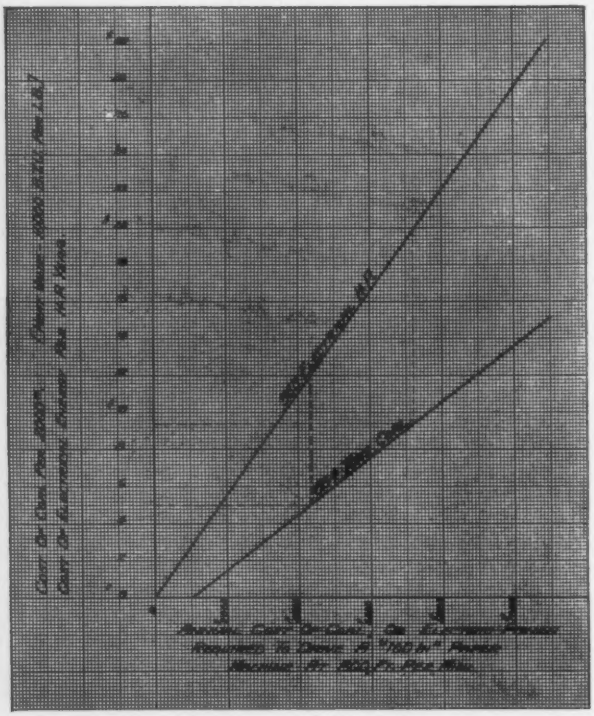

FIG. 1

The relative merits of a turbo generator and a motor generator are not so easily decided and it is the object of this paper to present a comparison based on operating records obtained in the plant with which the writer is connected.

This plant contains two 160 in. news print paper machines fitted with Harland sectionalized electric drives. The electric power required is supplied from direct current generators driven by steam turbines. Steam is delivered to the turbine at 200 lb. pressure with 200 deg. superheat and the exhaust steam is used in drying the paper.

The plant is fitted with steam regenerators between the turbines and the paper machines so that practically none of the exhaust steam is lost to the atmosphere.

As a result of several months' experience with the paper machines operating at 800 feet per minute, it has been found that:—

1. Each paper machine requires an output from the generator of 5300 kw.-hr. per 24 hours corresponding to an average load of 221 kw. or about 300 hp.
2. Each turbine absorbs an average of 30,000,000 B.t.u per 24 hours, which is about 7 per cent of the heat in the steam delivered to the turbine.
3. The quantity of steam passing through the turbine is about two-thirds of the amount required to dry the paper.

It is evident from these results that the heat absorbed in the turbine amounts to less than 5 per cent of the quantity required to dry the paper. This amount is so small comparatively that, if there were no turbines, the size of the steam boilers would be the same, the operating labor in the steam plant would be unchanged and the cost of repairs and supplies could not be reduced. Therefore, the only operating charges which can be made against the turbines are for the extra amount of coal, the repairs and supplies to the turbines themselves, and the interest and depreciation on the installation cost.

If it be assumed that coal having a heat value of 10,000 B.t.u. per pound is used and that the steam plant efficiency is 70 per cent it would require 4286 lbs. of coal to supply 30,000,000 B.t.u. to the turbine or 664 tons of coal per year of 310 days.

If a motor generator had been installed instead of the turbo generator, steam would be required for drying and heating only and it is probable that it would be generated at a lower pressure and with little or no superheat. The first cost of the steam boilers, then, would have been less and there would have been a further economy in the piping installation from the use of standard weight cast iron flanges and fittings in place of the extra heavy castings required with the higher temperature and pressure.

A careful estimate of these initial costs has been made, the result of which shows that in the particular plant under discussion the motor generator installation would have cost about $8,000 less per paper machine. The difference in annual expense for interest and depreciation may be taken, then, to be $1,000. The cost of labor, repairs, supplies and other operating expense in either case would probably be about the same, at least the difference would be too small to have any appreciable effect on the comparison.

If an output of 300 hp. is required from the generator, the input to the driving motor, assuming the efficiency of the set to be 85 per cent, must be 355 hp. which is equivalent to say 360 hp. at the primary transformers.

The whole question, therefore, resolves itself into the determination of which can be obtained the cheaper, 664 tons of coal or 360 electrical hp., after making a deduction of $1,000 from the annual cost of the electrical energy.

The accompanying chart (Fig. 1) which is self explanatory, has been made up to solve this question graphically for varying prices of coal and electric power. As these prices differ widely in different localities it is hardly possible to state definitely that one or the other of the prime movers is the more economical under all conditions, but, as indicated by the dotted lines on the chart, if coal can be obtained at a price equivalent to $5 per ton at 10,000 B.t.u. per lb. the cost of electric power cannot exceed $12 per hp. year if the costs are to be equal.

Similarly if electric power can be purchased for $20 per hp. year the equivalent price of coal may run up to $9.20 per ton. It is apparent, therefore, that under the present prices prevailing in most cases the turbo generator is likely to prove more economical than the motor generator, except in remote districts where water power is plentiful and cheap and coal is expensive.

*Member TAPPI, Chief Engineer St. Lawrence Paper Mills, Ltd., Three Rivers, P2.

Paper Testing Committee Report

By F. A. Curtis, Chairman

I. Program

A definite plan or program of work was arranged at the beginning of the year and the members of the committee asked to take part as follows:

1. *Microscopic Analysis—H. N. Lee*

Continue work of previous year and attempt to finish the corporative investigation and propose methods for adoption.

2. *Greaseproof Papers—H. A. Smith*

Develop suitable methods of testing grease proof paper.

3. *Papers used in the electrical industry—A. L. Allen and A. T. Randall*

Develop special tests for various insulating and cable wrapping purposes.

4. *Coarse Boards—A. R. Harvey and M. C. Walsh*

Develop tests that are suitable for the various types of coarse boards, with especial reference to box board.

II. Microscopic Analysis

The report of H. N. Lee appeared in the PAPER TRADE JOURNAL under date of November 22, 1923, under the title of "Microscopical Analysis of Paper by Eighteen Investigators using Different Methods." As a result of this investigation, two methods are proposed to the Association for their consideration.

On the publication of the report by H. N. Lee, a mathematical study was made of the results by E. A. Bergholtz of the American Telephone & Telegraph Company and his paper is preprinted under the title "Comparison of the Various Methods Used in Determining the Fibre Content of Paper."

A method for differentiating between soda and sulphate pulp in paper has been developed by E. Parke Cameron of the Forest Products Laboratory of Canada and has been tested by several laboratories. Reports of this method are very favorable. The method is presented in preprinted form.

III. Grease Proof Paper

The report of H. A. Smith is presented in preprinted form under the title of "The Turpentine Penetration Test for Grease Proof Paper." Considerable work has been involved in the development of this test and the co-operating laboratories are to be congratulated on the results of their effort. It is believed that this proposed method will be of considerable value to the industry.

IV. Papers Used in the Electrical Industry

Reports have been prepared by A. T. Randall and A. L. Allen, working independently, of qualities that are necessary for paper used in this industry and this work is to be continued and tests developed to determine these special qualities.

Contract has been maintained with H. H. Brown, a member of a sub-committee on Unimpregnated Insulating Paper of Committee D-9 on Insulating Materials of the American Society for Testing Materials. The physical and chemical tests proposed by this sub-committee seem somewhat more rigid than necessary for ordinary mill laboratory work. They include the usual tests with the addition of the following: Porosity, Apparent density, Acidity and Heat endurance.

The tests desired on insulating paper are as follows:

Moisture, thickness, tensile strength, tearing strength, bursting strength, folding, porosity, absorption, water rise, apparent density, fiber analysis, Metallic particles, heat endurance, acidity, ash, flexibility, dielectric strength and size.

Fish Paper

Of course, different insulating paper to be used for different applications should have different qualities. However, no one paper would have to be tested for all of the above named qualities.

For example, thickness, tearing strength, dielectric strength, and flexibility, also porosity are required on thin fish paper Fish paper is a cotton paper treated with either zinc chloride or sulphuric acid.

Condenser Paper

On a condenser tissue our tests would be confined to fibre, thickness, and porosity.

Rope Paper

On rope paper we would usually test for metallic particles, tearing strength, porosity, absorption and thickness.

The Sub Committee on paper, of Committee D-9 of the A. S. T. M. has been working on a specification for tests of paper and has just about completed their tentative specification. At present they are trying out four methods including the Technical Association of the Pulp and Paper Industry method for acidity. They claim that their preliminary data revealed the inadequacy of the Technical Association of the Pulp and Paper Industry method of determining acidity of insulating papers. They say that the three remaining methods will be revised for further work on four samples to be tested by nine laboratories. They are collecting data on three machines for testing tensile strength with the view of describing a method that will permit the use of both machines. They are also collecting data on two instruments for the testing of porosity or air permeability, to ascertain the uniformity of results obtained with these two instruments. They are considering the two methods for fiber analysis now up to the Technical Association of the Pulp and Paper Industry for adoption, provided, of course, that the Technical Association of the Pulp and Paper Industry adopts these methods.

Practically all of the members of the A. S. T. M. Committee are users of electrical insulating paper and not manufacturers. I would think it very desirable for the manufacturer to seriously consider all of these tests named above and which will also be named in the A. S. T. M. specification.

V. Coarse Boards

Although a detailed report of this part of the program is not available, it is planned to continue the project. There are few, if any, really satisfactory tests for coarse boards. Although a large portion of this product used does not require any special tests, the very great tonnage and the large percentage of total paper made warrants an investigation as to test methods. A report is expected in the near future from A. R. Harvey and M. C. Walsh.

Through the courtesy of B. W. Scribner, a number of abstracts of reports from the Paper Section of the Bureau of Standards have been made available for this meeting as follows:

1. The Detection of Animal Size in Surface Sized Papers by F. T. Carson.
2. Effect of the Weight of the Gauge Needle of the Mullen Paper Tester upon the Bursting Strength Test by C. J. Costello.
3. An Analysis of the Strength of Paper by F. T. Carson.
4. Comparison of Tensile Tester by Coleman J. Costello.
5. A Measure of the Color Characteristics of White Paper by R. E. Lofton.

VI. Conclusion

Continued application to the development of paper testing methods is very desirable. It is hoped that the members of the Association will continue to lend their support to this work.

Comparison of the Various Methods Used in Determining the Fiber Composition of Paper

By E. A. Bergholtz*

Of the various attempts which have been made to show the superiority of any one method of analysis of paper fibers over another, none seems to have succeeded in bringing forth conclusions based on balancing the advantages against the disadvantages of the respective procedures. Theories as to which method ought to be the best, have been delineated. The errors large and small which occur in using these procedures have been pointed out; but the accuracies or inaccuracies which appear in an average set of analysis have not apparently been correlated. Conclusions drawn from actual observations have never been developed, fully and roundly, in order to demonstrate for comparison the merits of the various methods; yet it is logical to suppose that this procedure would lead to the attainment of satisfactory conclusions. On this supposition, the following developments were made through the probability of error.

The various methods used by microscopists at the present time to determine the quantity of paper fibers in mixed pulp may be, in general, divided into three classes: the *Estimation*, the *Count*, and the *Measure* methods.

While it is true that there are various methods having different names, each may be classified in one of these three categories. There are for instance, the Clark, the Quick, and the Gravatt variations of the *Estimation* method. They are all alike in that the quantity of any kind of fiber in a mixture is determined by estimation, usually in comparison with slides of similar mixtures whose content is known. A difference exists only in the methods of preparing the slides so that they may be in the best condition for observation. The *Count* method has, in general, little variation. It consists essentially in counting the fibers of each class in a mixture and dividing the sum of the readings of each kind by the total number of fibers to obtain the percentage composition. The *Measure* proccdure has two well-known modifications, that of Spence and Krauss and that of Graff. Each consists in first measuring the length of various fibers on a slide, then adding these undimensional readings, and multiplying the sum by a factor to bring them to a weight basis related to rag. The weights of each kind are then divided by the total weight of all the fibers thus obtained to determine the percentage composition. In both procedures, weight factors are determined experimentally from mixtures of known composition. The methods differ in several minor details, however; the Spence and Krauss process measures the lengths, in diameters, using a mechanical stage to include all the fibers on a slide. In the case of the Graff method, the fibers are arranged in parallel on the slide and their lengths determined with a micrometer microscope. These, however, are really accidental variations. Both methods are the same in principle, in that the sum of the lengths of the fibers of a particular kind are multiplied by its specific gravity in relation to rag, and hence both the Spence and Krauss and Graff are really *fiber-weight-length* or *Measure* methods.

Several published efforts have been made to establish comparison among the three general procedures. Two are of importance at the moment. One is sponsored by the United States Government Printing Office, the results of which have been published in a pamphlet by Reed and Machmer, entitled "The Determination of the Fiber Content of Paper," PAPER TRADE JOURNAL, April 26, 1923. The other is that conducted by the TAPPI committee on Paper Testing, the results of which were published in the PAPER TRADE JOURNAL of November 22, 1923.

*Member TAPPI. American Telegraph & Telephone Company, New York.

The Determination of the Fiber Content of Paper

In order to develop the results shown in each of the papers, mentioned above, a comparison was made on the basis of the probabilities of error. Two methods were employed—theoretical and empirical. The evolution of the former is accomplished by the use of two formulas—of which one shows the *probable error*:—the other, the *huge error*.

The *proboble error* of any result obtained from a series of determinations is that quantity which must be added to or subtracted from the result (or average of those determinations) so that half of them are within the two limits thus obtained.

The *huge error* of any result is that quantity which must be added to or subtracted from that result in order to bring 90% of the determinations within it.

Two variations of the same empirical method are also employed, in order to develop the comparison of the various analytical methods namely the calculation of what percentage of errors lie within 5% and what percentage, within 10% of the average or true value of the different determinations.

In order to compare the results shown by the pamphlet of the Government Printing Office, the determinations were divided into two classes, those obtained by the *Estimation* method and those by the *Count* method, in the latter of which are included the ones gotten by the *Measure* procedure. This was done because not enough results were obtained by the Spence and Krauss method to warrant calculating them separately, and because suitable grounds for comparison were found on that basis since the *Count* and *Measure* methods are never considered inferior to the *Estimation* procedure.

Formula Method for Rag Sulphite Paper

The probable error was determined by the well known formula.

$$e = \pm\ 2/3\sqrt{\frac{(m-k_1)2 + (m-k_2)2 \text{ etc.} + (m-k_n)2}{n-1}}$$

where m = single average of all observations
k = result of each observation
n = number of observations
e = probable error
The huge error is 2.44 e —

The averages together with their probable errors are tabulated as follows for the amount of rag in the seven rag-sulphite papers analyzed, 11 results were obtained by the *Count* method and 15 by the *Estimation*.

Sample	Count	Estimation
1	34% ± 3.8%	31% ± 4.6%
2	73% ± 6.1%	77% ± 3.8%
3	41% ± 4.6%	43% ± 4.7%
4	19% ± 4.4%	18% ± 4.9%
5	69% ± 3.9%	71% ± 4.9%
6	82% ± 3.0%	86% ± 3.4%
7	30% ± 5.7%	27% ± 6.7%
Average	4.5%	4.7%

No. 4 was included in the *Count;* for though the method used was not stated, still from the fact that seven of the ten results determined by him are not multiples of 5, it is evident that the *Estimation* method was not used. Two analyses, one in the *Count* and one in the *Estimation*, which were farthest from the average were not included in the calculation as their difference from the respective averages is regarded as *too great.*

Since the papers under consideration were not made from known sets of fibers, it is important to show the probable error of the

average of all readings by each method. The following formula was used:

$$E = \frac{e}{\sqrt{n}}$$

where E is the probable error of the mean of average of the readings.
e = probable error of a single experiment (as mentioned above)
n = number of experiments (as determined above)

The results are as follows:

	Count method	Estimation
1	1.3%	1.0%
2	2.3%	1.0%
3	1.5%	1.3%
4	1.5%	1.3%
5	1.3%	1.3%
6	1.0%	0.9%
7	1.9%	1.8%
Average	1.5%	1.2%

From these results, it will be seen that the determinations whether made by the *Count* or by the *Estimation* procedure, show, in general, remarkably close agreement among themselves. No fault can be found with the agreement of the average of the probable errors of a single determination obtained by both methods, namely 4.5% and 4.7%. The difference is so slight that the two methods, from this point of view, are to be considered equal in value. The probable error of the average of all the observations differs somewhat because of the unequal number of observations.

Empirical Method for Rag-Sulphite-Papers

The above considerations are rather theoretical in character; so with the idea of determining how the probable error, as calculated by the formula, agreed with the empirical results, the following comparison was developed by empirical method. This consists essentially in determining what percentage of readings are within a specified percentage of the true or average value, e. g., 5-10-15%. The percentage of rag in each case is rounded to the nearest multiple of 5 because of the artificial limitation in the case of *Estimation* methods when readings are given within 5%, and for the reason that it is generally considered that no method of analysis can guarantee an accuracy greater than 5 per cent. The results obtained by this method are as follows for the *Count* procedure.

Sample	Within 5%	Within 10%
1	8 analysts	10 analysts
2	8	10
3	8	10
4	7	10
5	8	10
6	9	10
7	8	10
Av.	8.0	10

and dividing by 11 (the number of analysts) shows that 73% of the readings are within 5%, and 91% of the analyses are within 10%.

Similarly in the case of the *Estimation* method:

Sample	Within 5%	Within 10%
1	11 analysts	14 analysts
2	11	15
3	12	15
4	12	13
5	13	13
6	14	15
7	18	12
Av.	11.6	13.9

and on dividing by 15 (the number of analysts) it appears that 77% are within 5%, and 93% within 10%—which checks very well with the *Count* method. In other words the chances are 75 to 25 that an analysis of a rag-sulphite mixture will be within 5% of the true value of the mixture whether done by the *Estimation* or the *Count* methods and similarly the chances are 92 to 8 that it will be within 10% of the correct proportion.

Formula Used for Sulphite Groundwood Paper

It is not possible to draw conclusions as to the relative merits of the *Count* and *Estimation* methods in the determination of sulphite-groundwood mixtures principally because there is not even an approximate agreement between the results of the two methods. The determinations based upon 6 readings by the *Count* method and 16 by the *Estimation* method are as follows:

PROBABLE ERROR OF A SINGLE DETERMINATION

Sample	Count	Estimation
8	56 ± 4.7%	73 ± 5.0%
9	49 ± 5.4%	58 ± 8.2%
10	28 ± 3.6%	38 ± 5.4%

PROBABLE ERROR OF THE MEAN

Sample	Count	Estimation
8	56 ± 2.1%	73 ± 1.3%
9	49 ± 2.4%	58 ± 2.1%
10	28 ± 1.6%	37 ± 1.4%

From these results two things are obvious—first the *Estimation* method shows decided higher groundwood content than the *Count* method. Secondly—whereas in the rag-sulphite fibers, the difference between the averages of both *Count* and *Estimation* methods was as low as 1 per cent and never more than 5 per cent, in any of the 7 samples, the smallest difference in the case of 3 samples of sulphite groundwood is 9 per cent and the largest 17 per cent—and the chances are less than 1 in 10 that the *Count* and *Estimation* results would agree if a similar set of determinations were made.

Microscopic Analysis of Papers (Paper Testing Committee TAPPI)

In taking up the study of the results obtained by the microscopists who collaborated with the TAPPI Committee on Paper Testing, the same methods were used as those by which comparisons were made in studying the results shown in the United States Government Printing Office pamphlet. The probable error for the various papers calculated by the formula previously given are tabulated as follows:

Formula Method

PROBABLE ERROR

Sample	Estimation	Count	Measure
1	± 6.7%	± 3.9%	± 6.0%
2	± 3.6%	± 1.6%	± 2.7%
3	± 3.7%	± 4.0%	± 2.8%
6	± 7.8%	± 3.2%	± 5.9%
7	± 7.8%	± 4.6%	± 5.3%
8	± 8.0%	±10.0%	± 6.7%
9	± 3.4%	± 8.0%	± 3.0%
10	± 4.7%	± 4.7%	± 1.6%
11	± 5.0%	± 2.0%	± 3.7%
12	± 4.4%	± 5.2%	± 3.3%
13	± 5.9%	±11.7%	± 6.7%
14	± 6.0%	± 6.7%	± 4.1%
15	± 7.4%	± 2.2%	± 3.2%

The average error of all the determinations as listed above, grouped according to fiber combinations, is as follows:

	Estimation	Count	Measure
Rag-Sulphite	± 4.7%	± 3.2%	± 3.8%
Soda-Sulphite	± 7.8%	± 3.9%	± 5.6%
Sulphite-Sulphate	± 5.3%	± 7.6%	± 3.8%
Sulphite-groundwood	± 5.2%	± 6.3%	± 4.6%
Bleached-Unbleached Sulphite	± 6.7%	± 4.1%	± 3.7%

Empirical Method

The above considerations are rather theoretical in character, so with the idea of determining how the probable error with the empirical results, the following comparison was made.

It was found that of the 45 analyses made of the rag-sulphite papers, by the *Estimation* method, 73 per cent were within .5 per cent of the true value and 92 per cent were within 10 per cent of the correct proportion. This compares remarkably with the results obtained from the pamphlet of Reed and Machmer, i. e., "Determination of the Fiber Content of Paper," wherein 77 per cent of the rag-sulphite readings were within 5 per cent and 93 per cent within 10 per cent.

Similarly from the analyses of various other combinations determined by the *Estimation* method, the following probabilities are obtained:

Fibers	No. of determinations	Within 5%	Within 10%
Rag-sulphite-soda	30	17%	43%
Soda-sulphite	30	47%	77%
Sulphite-sulphate	45	58%	91%
Sulphite-groundwood	45	80%	91%
Bleached-unbleached sulphite	30	50%	73%

In the same way for the *Count* Method.

Fibers	No. of determinations	Within 5%	Within 10%
Rag-sulphite	18	89%	100%
Rag-sulphite-soda	6	17%	50%
Soda-sulphite	12	83%	100%
Sulphite-sulphate	18	39%	79%

Fibers	No. of determinations	Within 5%	Within 10%
Sulphite groundwood	18	44%	66%
Bleached-unbleached sulphite	12	83%	91%

In like manner for *Measure* method.

Fibers	No. of determinations	Within 5%	Within 10%
Rag-sulphite	21	71%	95%
Rag-sulphite-soda	14	14%	50%
Sulphite and soda	14	50%	80%
Sulphite-sulphate	21	81%	90%
Sulphite-groundwood	21	76%	95%
Bleached-unbleached sulphite	14	78%	100%

Observations

1. Some thought was given to averaging the errors by formula and by empericism but it is realized that not all mixtures are equally easy or difficult to examine, e.g. soda sulphite and rag sulphite papers.

2. The comparison of the analyses of rag-sulphite papers which are obtained from the work of Government Printing Office and TAPPI Paper Testing Committee, bring out some remarkable agreements.

	G.P.O.	Percentage of		TAPPI
	Readings	Error	Readings	Error
Formula (probable error)	50%	4.7%	50%	4.7%
Empirical	77%	5.0%	73%	5.0%
Formula (huge error)	90%	11.3%	90%	11.3%
Empirical	93%	10.0%	92%	10.0%

There is one flaw in this comparison, namely the apparent lack of agreement between the probable error and percentage of readings within 5 per cent, as determined by the empirical method, but it must b remembered that, by the latter method, only the number of errors greater than 5 per cent are taken into account, and not their value. This discrepancy, however, disappears in comparing the huge error and the number of errors with 10 per cent.

With this apparent difference explained, the agreement becomes remarkable; it indicates that the method of comparison is valid.

3. If a similar comparison is made with the *Count* method the following results obtain:

	G.P.O.	Percentage of		TAPPI
	Readings	Error	Readings	Error
Formula (probable error)	50%	4.5%	50%	3.2%
Empiricism	73%	5.0%	89%	5.0%
Formula (huge error)	90%	11.3%	90%	8.8%
Empiricism	91%	10.0%	100%	10.0%

The results as obtained from the TAPPI report are to be questioned because too few readings are represented—another proof of the invalidity of these results is found in the discrepancy which lies between analyses by the *Count* and by the *Measure* methods, wherein empirical results of the *Measure* method agree with those of the *Estimation;* and yet it would be difficult to prove that the *Count* procedure is better than the former.

4. With regard to the analyses of sulphite-groundwood mixtures in the Government Printing Office Report, no satisfactory conclusion can be drawn except that the results by either one or the other are decidedly wrong. The fact that only six investigators used the *Count* method may have something to do with this. One thing to be noted is that the average of the *Estimation* results are 10 to 17 per cent higher than by the *Count* method.

5. In the case of rag, sulphite and soda mixtures TAPPI report only 50 per cent are within 10 per cent of being correct by any method. It is to be noted that the errors as far as the rag contents are concerned is the same empirically as for rag-sulphite mixtures.

Measure Method	Estimation Method
70% within 5%	77% within 5%
93% within 10%	90% within 10%

The readings by count method are too few, being only six altogether. However, as it is, 80 per cent are within 5 per cent of their true values and all are within 10 per cent of them.

The large errors then are to be found in the mis-readings of the sulphite and soda content. The principal cause of this is very likely lack of difference in color.

6. The *Estimation* and *Measure* methods are equal by empirical comparison when soda-sulphite mixtures are examined. Strange to say, the *Count* method surpasses both—which is difficult to explain. The probable error by the *Estimation* method is the greatest of the three.

7. The probable error of the *Estimation* method when applied to sulphite-sulphate pulp is greater than that of the *Measure* method, yet the number of readings within 5 per cent and 10 per cent of the true value is the same by both methods. These results, taken in conjunction with the results obtained by Lofton and Merritt in Technologic Paper No. 189, of the Bureau of Standards, where the average of the probable errors is 4.0 per cent, indicates that the *Estimation* method yields to neither the *Count* nor the *Measure* method in accuracy.

8. The comparison of the different analytical methods applied to sulphite-groundwood paper shows the same percentage of readings within 5 per cent and 10 per cent as the *Measure* method, i. e, about the same as for rag-sulphite mixture. Yet the probable error of the former is greater, being 5.2 per cent to that of 4.6 per cent by the latter. However, if the determination which gives 44 per cent sulphite to the mixture having 20 per cent be omitted, the probable error of the *Estimation* method becomes 4.5 per cent which is about that for rag-sulphite mixture.

9. The *Count* method shows poor results for sulphite-groundwood fibers where the groundwood content is over 50 per cent. All the errors except one are 15 per cent or more out of the way.

10. The *Estimation* method appears comparatively poor for mixtures of bleached and unbleaced sulphite, for which no certain reason is given.

11. It is realized that in certain cases the above comparison may be somewhat inaccurate. It must be borne in mind that where 20 readings are concerned a difference of one means a difference of five in the percentage of readings within 5 per cent or 10 per cent. If there are only ten or eleven the difference would be 10 per cent, and interpretations should be made in accordance with this fact. This point is extremely difficult if not impossible to convey by figures.

12. It is realized that the probable error is likely to be different for the same fiber mixtures, if the percentage composition of the mixture is changed. Yet a comparison could not be made for the different concentrations, as readings would be too few, and as the mixtures of different fibers were all treated in the same way for each analytical method, the procedure is legitimate.

13. In comparing the results which have been obtained by different methods of fiber analysis it is well to bear in mind the following facts mentioned by J. W. Mellor, "Higher Mathematics for Physicists and Chemists."

a. Small errors occur more frequently than large ones.

b. Positive and negative errors occur with equal frequency.

c. Very large errors do not occur.

d. Large errors occur more frequently than is to be expected by formula.

e. The occurrence of large errors depends "in some curious way" on the number of observations.

Conclusions

1. It seems definitely settled that for rag-sulphite, sulphite-groundwood and sulphite-sulphate mixtures, the *Estimation* is equal to either the *Count* or *Measure* methods in accuracy. Based upon

considerations of time, simplicity, expense of apparatus, and required experience, it is decidedly superior.

2. Rag-sulphite-soda analyses are unreliable by any method.

3. The analysis of soda-sulphite mixtures could be improved for all methods if a better differentiation in color were obtainable, especially for the *Estimation* procedure.

4. Analysis of bleached-unbleached sulphite is not as reliable by *Estimation* method as by the *Count* or *Measure* procedure. Poor differentiation in color, due to lack of control in manipulation, is probably the fundamental cause of this discrepancy.

Comparison of Tensile Testers

By Coleman J. Costello*

An attempt has been made to compare the relative values of several commercial machines in common use for determining the tensile strength of paper. Because of the great variety of such machines, it was thought advisable to limit the number of those considered to four which would be representative of the many types on the market. Two of these machines are of the inclineable balance type, operated on the deadweight principle, and best suited to test strips of paper approximately 4 inches long, and 1 inch wide or 15 millimeters wide. A third machine was hand-propelled, and tested inch-wide strips of paper 4 inches long. This machine registered the breaking strain on a gage. The fourth machine was best suited to test strips of paper approximately 2 inches long and 15 millimeters wide. This machine is operated by a hand-lever which is connected with a set of springs and the strips are placed in a horizontal position.

Twelve lots of paper were selected for testing, these being representative of a wide range of types. The average of 10 tests was taken to determine the tensile strength of each sample and duplicate tests were made in each case. The specimens were tested in both directions of the sheet, more than 1900 tests in all, being made. The strips for testing were all cut to the size best adapted to each particular machine, as given above.

Considering the amount of variation between individual tests made on the sample, two of the machines gave results superior to those obtained with the other two. All four machines gave good results as regards comparison of averages obtained for duplicate tests on the same machine. That is, as regards duplicate determinations made on the same machine, very close check results may be obtained. When the average results obtained by the different machines are compared, however, there is quite a wide variation. This is due, no doubt, not only to difference in the mechanical accuracy of the machines, but also to difference in size of the paper strips tested and the rate of application of the load. Apparently tensile testers of different types cannot be used for strictly comparative results and therefore, in reporting results of tensile tests, the kind of machine used should be specified.

*Junior member TAPPI. Laboratory assistant, Paper Section Bureau of Standards.

Report of the Soda Pulp Committee

By G. K. Spence, Chairman

During the past year the Soda Pulp Committee has devoted considerable time and study to a number of important problems relating to the industry.

The problems referred to are:

1. "Late developments in washing brown stock with continuous filters," which also includes the study of brown stock washing with centrifuges or in any other way.
2. "Evaporation of Spent Liquor."
3. "Deterioration of Color of Soda Pulp on Ageing."
4. "Reduction of Bleach Cost by Chemical Control."
5. "Chemistry of the Alkaline Wood Process."
6. "Various methods of reclaiming Lime from the cauticizing process in soda and sulphate pulp mills. These are all important problems in the manufacture of soda and sulphate pulp. At our sectional meeting Wednesday afternoon, all of these subjects will be discussed and if time will permit, other questions will be taken up; such as disposal of black ash, continuous causticizing, destructive distillation of spent liquor and extraction of pine chips before cooking.

Owing to the inability to secure a chairman for the Sulphate Committee the sectional meeting, as in the past two years, will be a joint meeting to discuss soda and sulphate pulp problems, and all subjects taken up will be common to both processes.

Due to the discussions and work of the Soda Pulp Committee during the past few years, a number of mills have made material improvement in their operating conditions, especially in the process of causticizing, cooking, washing and bleaching. During the next year your committee will have collected and studied enough data to give definite recommendations regarding washing brown stock, and methods for disposal of lime sludge from soda and sulphate pulp mills.

Future work as planned will also cover disposal of black ash and improved methods of cooking and bleaching, as well as developments in destructive distillation of spent liquor.

Heat, Light and Power Committee

During the year the committee has not been called upon to do any intensive investigation Considerable information has been sent out to some of the members on specific problems such as illumination and power requirements. The committee undertook to prepare for the Annual Meeting a report on Power Losses but its investigations have not advanced sufficiently to report at this time.

Another subject of interest was the use of accumulators, and steam turbines for paper and pulp mills and this subject is under discussion by the committee now and no doubt something will be offered at the fall meeting.

The third subject is a moisture meter for automatically registering and indicating the amount of water in the sheet as it passes over the machine. We hope to have something to report along this line at the next meeting as the trial installation is now being put in.

The committee will undoubtedly confine its efforts for the coming twelve months to the study of the following subjects: Use of steam accumulators, heat losses, power losses, moisture meter.

In addition to the foregoing if any member has any suggestions to offer, the committee would welcome them.

Continuous Causticizing Plant of Penobscot Chemical Fibre Co., Great Works, Me.

By W. D. Mount*

Before describing the new causticizing plant at the mill of the Penobscot Chemical Fibre Company, Great Works, Maine, I think it necessary that brief mention be made of one basic factor underlying any continuous process of causticizing, and on which success must be predicated; namely, thorough agitation and boiling.

It has been my experience during a period of twenty-five years' active connection with the manufacturing and technical end of the alkali industry, and from what I have seen of operations in many plants, that with scarcely an exception the weakest link in the batch process is defective agitation and insufficient boiling. Mechanical agitation by means of equipment more or less standardized and common to the great majority of batch operations can lay no claim to 100 per cent efficiency—if by efficiency it is understood that we mean the thorough mixing and agitation of the contents of tanks varying in size from 10 to 13 or more feet in diameter, and as many in depth.

Advantage of Continuous Process

A mere enumeration of the advantages of a continuous process such as that installed at Great Works clearly indicate by inference the disadvantages of the batch process displaced. These advantages are as follows:

1. The general advantages characteristic of a continuous method of carrying on any chemical process as compared to an intermittent or batch method of conducting the same process.
2. The continuous process, including a complete lime recovery plant, requires less than two-thirds the floor space required by a batch system of causticization of equal capacity but without lime recovery.
3. A marked reduction in the amount of piping and fittings needed and the entire elimination of the familiar battery of causticizing and settling tanks.
4. A reduction of alkali loss in causticizing to a uniform level of less than one-half of one per cent.
5. A reduction in steam consumed to approximately 25 per cent of that normally required by the batch system; if exhaust steam at 10 pounds pressure is available, the use of live steam can be completely eliminated.
6. All apparatus and piping in sight and easily accessible.
7. Decreased cost of repairs and maintenance.
8. Uniform and positive chemical control of the process which tends to eliminate the factor of the personal equation which so often leads to inefficient operation.
9. A better place for the operatives to work, and a department which can easily be kept in a neat and orderly condition.

It must be distinctly understood that the claims which are made for continuous causticizing have not been based upon any one of these features alone. The advantages which I have mentioned are characteristic of the process as a whole and it has been demonstrated that they cannot be obtained in any other way than through the complete adoption of the continuous system. In other words, it would be impossible to change the batch system either in whole or in part and obtain the results which can be obtained with the continuous system.

Process One of Simplicity

The process is simplicity itself. There is no complicated apparatus or equipment to get out of order. Its maintenance does not add to the burdens of the superintendent nor does its operation require the attention of a corps of skilled chemists. Two men of average intelligence on each shift can handle the entire causticizing plant; if a lime recovery unit is connected with the causticizing operation, three men can look after both.

The special apparatus and equipment required for the process includes the causticizer, decanter, rotary filters, lime slaker, and certain auxiliary equipment such as vacuum pumps, lime and liquor pumps, etc. The causticizer, which is a tower formed of specially constructed rings, is supplied continuously with calcium hydrate and sodium carbonate in the proper proportions by means of pumps. A steady discharge of a mixture of caustic liquor and lime sludge is pumped from the bottom of the causticizer to the decanter whence the clear sodium hydrate flows from the top and the thickened sludge is drawn from the bottom. The operation of both causticizer and decanter is continuous yet the hydrate drawn from the decanter is clear. The sludge is pumped continuously to the filter where it is washed, and discarded, or reburned and reused for causticizing.

The following description of the Penobscot plant was prepared by my brother, J. E. Mount, who supervised the work of installation and the commencement of operations.

This plant was installed to replace a worn out batch system of causticizing, and at the same time effect various economies in operation which could not be obtained with the old system.

The apparatus consists of one causticizing tower, 6 x 34 ft., one decanter with a capacity of 40,041 gallons, two slaking pots for milk of lime, four continuous discharge rotary vacuum filters, 6 x 3 ft., and two duplex exhausters, together with such auxiliary apparatus as lime and liquor pumps, traps, etc.

The capacity required was to be sufficient to supply caustic liquor for a plant making 100 tons of soda pulp daily. The total floor space occupied by the plant as completed is 3750 sq. ft., or about one-fourth the space required by a plant of the same capacity making caustic by the old method. The saving in piping is fully as much as that in floor space.

Tandem-run Filters

The filters are so connected that two are run in tandem, the cake from the first being repulped with water and run over the second. This gives two separate filter units of such capacity that only one unit need be run at a time, the other being held in reserve. At present the cake from the secondary filter is discarded and washed away, but it can be easily used in a recovery plant should one be installed later.

In the operation of the plant, the lime to be used is first slaked in two slaking tanks. The milk of lime should contain from 150 to 200 g.p.l. CaO. When slaked in hot water it averages about 170 deg. fahr. in temperature. The liquor is pumped from the leach cells to two receiving tanks, and is pumped from each of these alternately and continuously to the causticizing tower. When the liquor from one tank is being pumped to the causticizer the other is being filled from the leach cells. The average temperature of this liquor to the causticizer runs about 135 deg. fahr. From experience we have found that the strength at which the liquor should be held is about 40 deg. Twd., or 230 g.p.l. Na_2CO_3. This liquor is tested regularly and is held at as nearly a constant strength as practicable. The liquor is pumped into the top of the causticizing tower from whence it flows down around a series of mushrooms to the bottom.

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Causticizing takes place in the lower third of the tower; the milk of lime is pumped into the third compartment from the bottom at which point it meets the descending carbonate liquor.

Steam and a small amount of air are admitted at the bottom of the tower and rise through the various sections agitating thoroughly the lime and liquor solutions. Before the steam reaches the top, it is completely condensed.

Pumping to the Decanter

The mixture of caustic liquor and lime sludge is pumped from the bottom of the tower to the decanter, where the sludge settles to the bottom and the clear caustic liquor rises to the top and flows off over a launder to the digester measuring tanks.

A control test is made on the discharged liquor from the causticizer every 15 min., and for the first one and one-half months of operation averaged 82.5 per cent causticity. The average temperature was about 205 deg. fahr. Once an hour the causticity of the decanter is determined. During the same period of operation, namely, one and one-half months, the average test of this liquor was 88.9 per cent causticity. The increase in causticity is explained by the fact that enough free CaO is usually discharged in the mixed liquor and lime sludge from the causticizer to raise the percentage of causticity in the decanter from 4 to 6 points over that from the causticizer, on the average. We did not attempt to obtain a causticity from the decanter of over 90.0 per cent. With regular operation there would have been no trouble in getting this up to 92.0 per cent by increasing the percentage of CaO in the causticizer. The average temperature of the decanted liquor was 140 deg. fahr.

We had no means of measuring the amount of steam used by the causticizer, but as all that was admitted to it was through a 2-inch valve one and a quarter turns open at a boiler pressure of 80 lbs., it was comparatively a small amount. I might mention here that the causticizer is completely lagged with magnesia blocks which in turn are covered with a steel jacket.

From Decanter to Primary Filter

The settled lime sludge is taken from the bottom of the decanter at an average temperature of 150 deg. fahr., and a consistency of 24.6 per cent solids, and pumped to the primary filter. After passing over this and the secondary filter, the average per cent of Na_2CO_3 in the cake for the first one and one-half months of operation was 0.95 per cent. During the last month, we brought this average down to 0.72 per cent Na_2CO_3, but as we had more or less trouble in getting a steady supply of wash water for the filters during most of the time, no trouble should be experienced in holding the alkali content in the cake below 0.5 per cent Na_2CO_3 when operating conditions become more settled.

The filtrate is pumped from the filters to the decanter where it mixes with the liquor from the causticizer. The average free CaO in the discarded cake from the filters was 3.66 per cent. The average moisture content of the cake was 38.8 per cent. The average vacuum carried was about 18 in. mercury. The moisture content can be decreased by raising the vacuum and by providig a better supply of hot water. The average thickness of the cake from the filter was about *one inch.*

We endeavored to carry the strength of the liquor from the decanter slightly above that required by the digesters, 8.0 per cent NaOH by weight, so that a small amount of doctoring with water could be allowed for each digester cook. The average amount of liquor decanted when running at full capacity, i.e., present capacity of plant, was about 103,056 gallons per diem. This liquor was clear and free from lime and carbon specks. The capacity can easily be doubled should need arise.

Considering the fact that the plant has been running only about two months, that a set of green operators had to be broken in, that necessary adjustments to machinery had to be made, and that operation has been more or less intermittent, the results accomplished approximate those sought for to a marked degree.

What Plant Has Demonstrated

The plant has clearly demonstrated the following benefits:

(1) It has brought about a much better place in which to work, with less piping and fewer pumps to look after.

(2) It will show marked economy in steam consumption which will be reflected in the coal pile.

(3) It has shown a large saving in alkali.

(4) The lime loss is no greater than before.

(5) The causticity is better.

(6) The liquor to the digesters is clearer and better settled.

(7) The lime is delivered from the filters in a form where recovery can be had.

(8) There is a saving in power and in maintenance.

These benefits which the plant shows at present will each continue to increase as operating conditions improve and experience in handling the apparatus is gained.

Alexander's Stain

By E. Parke Cameron*

Differentiation between Sulphite and Soda Wood Pulps.

The stain consists of three solutions:—

I. 0.2 g. Congo red
300 cc. Distilled water

II. 100 g. Calcium nitrate
50 cc. Distilled water

III. Herzberg's chlor zinc iodide stain made up as follows:—
(A) 20 g. Zinc chloride
10 cc. Water
(B) 2.1 g. Potassium iodide
0.1 g. Iodide
5 cc. Water
Add (B) to (A) and prepare in usual way.

Manipulation:—

The sample to be tested is first stained with 2 drops of the Congo red solution for 1 minute after which the excess dye is carefully blotted off and the sample allowed to dry.

The dry stained sample is then immersed in 3 drops of the Calcium Nitrate solution and allowed to remain for one minute. At the end of this time one drop of the Herzberg stain is added, the whole quickly and thoroughly mixed and the cover glass placed on.

The slide may be examined immediately but there seems to be a slightly stronger tone to the colors if it is let stand for three or four minutes before examination. The sulphite should be an evenly stained *pink* and the soda a *deep blue.* The vessels in a hardwood soda pulp are the hardest portion to stain properly, and if these give a good color closely resembling that of the soda fiber the stain is working very well.

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Special Soft Rubber Rolls for Paper Machines

By R. H. Whitney*

The results arrived at in this discussion are based almost entirely on the stated purpose of the Technical Association of the Pulp and Paper Industry:—"An interchange of ideas among its members in order that processes of manufacture may be made more efficient and improved along technical lines." We are indebted to S. D. Warren Company, Hammermill Paper Company, Michigan Paper Company, Fletcher Paper Company, and others for comparisons made between the new soft rubber rolls and those previously used. Especially do we appreciate the co-operation of H. F. Obermanns of Hammermill Paper Company who has given much time and assistance in obtaining accurate data.

Corrugation

Papermakers generally have wanted to use softer rolls but have not been able to do so because the old line soft rubber covers corrugated quickly. This resulted in constant regrinding and production loss. In our table we have had to omit figures on the length of time these new rolls have run without corrugating because none of these have yet corrugated. There are 50 in operation and so far only 2 have had to be reground. (Reports on these were not available for this paper.) With 48 out of 50 running from 1 to 9 months and showing no sign of wear we believe that this question is answered to everyone's satisfaction.

Water Removal

How much water will they remove? Naturally a harder roll should take out more water than a soft one. The pressure is applied along a small contact area and is greater per unit area with the hard roll. Yet looking at the tabulation of actual service results you will see that these new soft rubber covers testing 92 to 102[1] are removing as much as former rolls testing 45 to 60 with the same pressures, speeds and felts. In one case there is a slight increase indicated with the soft roll, in another a practically negligible loss of ¾ of 1 per cent is reported. All others are taking out the same amount as formerly. I could amplify this by ten verbal reports (some based on laboratory moisture tests) that show the same satisfactory result.

The evident conclusion was most surprising to me; it may be to many of you. The only way we can account for it is that the extreme resiliency and comeback of the new compounds aids in the squeezing action and compensates for hardness in the former covers which lacked this resiliency.

It is generally recognized that the use of a more open felt allows greater water removal. The softer rolls have repeatedly proved that they go far in eliminating felt marks, thus making more open felts practical. In one mill they are now successfully using a more open felt with the soft rolls, and while it is not yet possible to publish the results we know these are satisfactory.

More pressure can be used with the soft rolls without harm to the sheet or felt. Naturally this is harder on the roll, but in one case an additional 3600 lb. has been added and the soft roll has been running for 5 months without showing any ill effects. The increased pressure took out more water.

Summing up the investigation as to comparative water removal: we have found that the new soft stocks are satisfactory in all cases; also they pave the way for taking out more water in the press, which will reduce drying costs and make higher speeds practical on present machines.

Felt Efficiency

The reports tabulated give such a clear picture of the increased felt efficiency with the softer rolls that little discussion is necessary.

Wherever any attempt has been made, or other factors permit, felt washing has been reduced from 33 to 70 per cent. This is truly a big advantage in many ways, and measured in dollars and cents this item alone will in most cases more than pay the roll cost.

We find that felts last from 25 to 50 per cent longer with the new soft rolls than they did before. A score of additional verbal reports say the same thing and in only one instance can we find that felts have given only equal to previous service.

These results are fine, but they are going to be a lot better. Again we must recognize that the soft rolls allow for more open and harder twisted felts. These will be tougher and last still longer, and they will not fill up so quickly. So once again, what has been accomplished points ahead to still greater efficiency.

General Application

We have been talking entirely of first press rolls. It may be interesting to note other applications of these new soft stocks in some of which they have already proved advantageous.

They are running on second and third presses showing no weakness and helping the felt and sheet. On a smoothing press their ability to maintain a natural surface longer than old line compounds makes them exceptionally good. You will be interested in the surface of the roll on exhibition in Booth 44A of the Exposition. This shows more clearly than I can tell, the extremely smooth finish which the new covers acquire after 1 or 2 weeks in operation and maintain throughout the life of the roll. One mill says they are the finest thing ever seen on a smoothing roll.

Running in hot glue at a temperature of 170 deg. Fahr. they have already exceeded previous service from other covers and are still going strong. We have them on waxing and sizing rolls and while it is not yet time to make established claims it is only logical to expect that wherever heat is encountered the new stocks will be a great improvement as you will see shortly.

For squeeze rolls and primary presses they have given absolute satisfaction and are now being tried out on the regular press of machines making heavy board. Two rolls have also been covered for top suction rolls although we make no claims for this work as yet.

Although, being less affected by age, maintaining a natural surface longer, resisting heat, and giving greater cushioning, these new compounds apparently offer opportunity for economy on paper machine rolls in general.

The New Rubber Compounds

Questions come up as to how these new stocks differ from the previous rubber roll coverings used. To answer this requires some consideration of rubber manufacturing problems and means of determining physical properties of different compounds.

The problem of covering a paper machine roll becomes involved by the necessity of tying the cover to the metal core with a hard rubber or vulcanite base. The coefficient of contraction of hard rubber is several times greater than metal and as it remains rigid after curing there is a powerful grip between the two. In turn, the base and cover being cured at the same time unites these and anchors the cover.

The roll is given one cure which must be long enough to cure

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*Memb. TAPPI. B. F. Goodrich Rubber Company, Akron, O.

[1]All figures given on hardness, refer to penetration of a ¼-in. ball point and 1 kg. weight on a Pusey & Jones plastometer.

ACTUAL COMPARISONS OF SPECIAL NEW SOFT RUBBER ROLLS WITH FORMER ROLLS USED

Through Courtesy of Hammermill Paper Company, S. D. Warren Company, Michigan Paper Company, Fletcher Paper Company, and Others.

Machine width, in.		94	110	100	128	100	132	111	150
Machine speed, f. p. m.		100–250	400	400	265	400	450*	390	800
Kind of paper		Book	Bond	M. G. Wrapping	Folio Tablet	Sulphite Bond	Bond	Wrapping	News Print
Diameter roll, in.		18	20	20	20	20	20½	20¼	25¾
Thickness cover, in.		21/32	¾	1	¾	1	1	13/16	1½
Hardness of rubber	High Speed News	92	95	96	95	93	94	96	100
	Former Cover	60	65	49	45	54	57	(Hard)	70
Diametrical crown	H.S.N.	0.036	0.040	0.040	0.035	0.043	0.048	0.040	0.080
	F.C.	0.030	....	0.033	0.025	0.025	0.040	0.024	0.065
Total pressure, lb.	H.S.N.	8,000	No	13,000	10,000	13,000	18,000	Less with	....
	F.C.	8,000	Change	13,000	10,000	13,000	18,000	H.S.N.	Same
Water removed, %	H.S.N.	As much	Same	Same	Same	11.4	Same*	Approx.	....
	F.C.	or more with H.S.N.	....	....	....	11.-	....	Same	0.75 Less with H.S.N.
Felts washed, hr.	H.S.N.	144	24	Same**	24	Same	Same**	36	96
	F.C.	72	12		12	....		24	30
Felts lasted, days	H.S.N.	Not	30	40	40	34	40	24	Satisfactory
	F.C.	determined	24	26	24	28	30	18	10

*Speed with previous roll was 400 f.p.m.. **No attempt made to cut down washing. These rolls have been in service for an average period of 4½ months.

the hard rubber. It is obvious that the soft rubber cover and the base must be perfectly balanced or the cover will have been overcured when the hard rubber is cured to its proper and necessary hardness. Practically all cover stocks were formerly overcured when the base was properly cured.

The results of overcuring are not seen immediately after cure, but in the course of several months these compounds lose their resiliency and comeback. In addition an oxidized skin or crust forms on the surface, which offers little resistance to abrasion. On press rolls a soft cover is flattened out at the point of contact. The cover must have resiliency to regain its original shape during each revolution. As the old stocks lost their life this distortion showed itself by a washboard appearance on the surface of the roll, which simply means the rubber had lost its ability to resume its natural shape after being flattened out. Soft stocks compounded along new lines and adjusted to a hard rubber cure, when aged in the life oven and put through a hysteresis test at once indicated unusual ability to withstand internal strains over a long period, and to maintain a natural surface.

The life oven is used to artifically age rubber. By applying a predetermined temperature we may for instance represent a year's normal aging by 2 days in the oven. The hysteresis loop is the curve developed by a tension arm during constant stretching and contraction of the rubber. This measures the fatigue of the rubber from internal rearrangement (as evidenced by heat) and compares roughly to the action a roll must withstand in service.

A comparison of the new compounds with the best old line stock obtainable is shown in figures taken from several of these curves. The old line stock has a hardness of 50. Against this we show the new compound "Kraft" of the same hardness, and the new "High Speed News" testing 95. It is of course difficult to get an accurate relation between compounds of different hardness, but remembering that in each case the cure has been balanced to a hard rubber cure the results are of value, and have so proved in actual service. The efficiency of the first loop is of no value for our purpose as the internal rearrangement to working conditions has not taken place. We have therefore taken results at the fifth loop or distortion of the rubber.

With results taken directly after curing, after a medium aging and after comparatively long aging we get these figures:

EFFICIENCY

Stock	No aging %	Medium aging %	Long aging %
H.S.N.	86.1	83.7	80.7
Kraft	82.7	68.6	42.4
Old compound	63.9	Broke down	Broke down

The comparison with HSN must include the fact that being much softer it is distorted more in service, but the other two are on exactly the same basis and these figures leave no room to question the superiority of the new compounds.

This last chapter may have seemed so distinctly a treatment of rubber as to be irrelevant here. However, we have already shown that these newly developed soft rubber compounds as roll covers—

1. Do not corrugate quickly causing expense or production loss due to regrinding.
2. Remove the required amount of water.
3. Pave the way for taking out more water.
4. Cut down felt washing.
5. Increase felt life.
6. Decrease felt marking.
7. Allow the use of more open and tougher felts.
8. Make higher speeds and more continuous production possible.

In doing these things we believe they fairly earn at least this superficial explanation as to how they stand out as a real advance in the chemistry of rubber brought to the service of the paper industry.

Paper Drying Committee

F. R. Hyatt, Chairman

During the past year the activities of the Paper Drying Committee have been concentrated mainly on the formulation of a drying code which would cover all the essential items in connection with the steam consumption of paper machines.

The items of this code were decided upon finally at the Fall meeting of the Technical Association last October. It was then printed and sent out to a large number of mills about the middle of January of this year. We realize that due to the short time elapsed since receiving these, very few mills have had an opportunity to make tests and return the blanks. Therefore, I recommend that the committee, for the coming year, continue its activities along the lines it has just nicely started.

All machines should have a system that,

1—Keeps the driers free from water.

2—Keeps the driers free of air.

3—Prevents uncondensed steam from escaping from the driers.

At the same time the paper must be dried in such a way that the desired quality is not impaired.

We believe that the proper tabulation of the data for comparison from a large number of mills will help us all in accomplishing the essentials of any good drying system as listed above.

The next steps from an economical standpoint which are being developed in connection with the drying of paper are the recovery of heat from the water vapor leaving the machines and the drying of paper under a pressure less than atmospheric.

Both of these phases fall logically under the work of the Drying Committee and I recommend that they also receive our consideration during the coming year.

Report of the Committee on Waste

R. B. Wolf, Chairman—G. D. Bearce, Vice-Chairman

The Committee on Waste has accumulated information, made investigations and rendered reports during the past two years upon the following subjects:

1. White water losses and their reduction.
2. The utilization of bark and wood refuse.
3. The reduction of broke losses.
4. Heat losses in pulp and paper mills.
5. Handling materials in pulp and paper mills.

White Water Losses

1. The report on White Water Losses covered the results of a number of tests supervised by representatives of the Committee and contained figures supplied by companies interested in this particular problem. The report brought out the fact that the inportant things to be considered in an attempt to reduce the white water losses in pulp and paper mills are:

1. The reduction of stock loss through re-utilization of white water by means of self-cleaning shower pipes and other methods.
2. The reclamation of fiber and other material in white water by means of various types of savealls.

The sedimentation tank appears to be admirably suited to mills using stock that contains considerable filler. Mills which use a small amount of filler apparently get the best results by a combination of screen saveall and sedimentation tank. The mills that use a long fiber stock exclusively, obtain satisfactory results with one of the various types of screen savealls.

It was pointed out that it is feasible under operating conditions to reduce the fiber and filler loss to less than 5 lb. of material per 10,000 gallons of waste white water. The maximum allowance for losses based upon pulp or paper production, as indicated in previous reports, is estimated as follows:

1. All long fiber stock 0.5 per cent.
2. Mixed long and short fiber 1 per cent.
3. Short fiber stock 1.5 per cent.

Steam Pollution

In connection with white water losses the problem of steam pollution cannot be over-emphasized. Many states have laws or pending legislation regarding stream pollution. Among these are the states of Massachusetts, Michigan, Wisconsin and Pennsylvania. If the individual pulp and paper mills study and solve their problems they will not only reclaim fiber that is of appreciable value, but will also meet the requirements of any laws or inevitable legislation regarding stream pollution.

The future work on white water and fiber losses must necessarily be done by the individual companies. The information regarding the tests is available and the data will show them just what can be accomplished at their own mills under their particular operating conditions. The Forest Products Laboratory in co-operation with the Committee is developing a method of comparing the white water losses at different mills. They will ask a number of mills that make the same product to report their stock loss figures to the Laboratory on a standard form. This information will be tabulated and returned to the participating companies so that they will be able to compare results with one another.

Bark and Refuse Utilization

2. The complete report on Bark and Refuse Utilization will be presented in the near future and contains all available data upon bark presses and the furnaces now used in the utilization of wood and barking refuse. The report will cover the various methods of handling this problem under different conditions, and will give figures that will indicate the improved results that can be obtained with adequate equipment and proper control.

Appreciable savings can be effected by the more economical utilization of bark and while tests indicate that each mill has its own particular problem, the construction of the furnace, control of the air, and the method of feeding the fuel are three points that must be given special attention. In general, all refuse must be approximately 50 per cent dry in order to be burned with reasonably good efficiency.

Reduction of Broke Losses

3. The Reduction of Broke Losses was reviewed and this subject is a continuous individual problem with each mill. Considerable interest was stimulated and the forms of operating reports that were suggested by the Committee have been adopted by a number of plants with effective results. Constant records showing the per cent of broke loss are of much value.

Heat Losses

4. The report of Heat Losses in Pulp and Paper Mills outlined the various sources of loss in the entire mill. Each mill has its particular problem and a more detailed study by departments can doubtless be made by the Heat, Light and Power Committee which will result in further valuable information. The heat losses in the sulphite, soda, and sulphate mills should also be considered by the committees that deal with the manufacture of these pulps.

Handling Materials in Pulp and Paper Mills

5. The report on Handling Materials in Pulp and Paper Mills gave an outline of material handling problems and also a classification of handling equipment. The application of handling equipment was briefly taken up for each commodity and the various handling methods were illustrated.

The handling of materials is a very important item of cost in the manufacture of paper which has greatly increased during the past few years on account of the rapidly increasing cost of labor. Each mill has its particular problem and a study of the cost of handling a commodity under present methods compared with the installation and handling cost with modern equipment should be thoroughly investigated.

The Utilization of Decayed Wood for Pulp

This is one of the most important problems that confronts pulp and paper mills at the present time. Realizing that it is an international problem a Joint Committee was appointed to co-operate on this work, representing the Technical Association, Woodlands section of the Canadian Pulp and Paper Association, the Forest Products Laboratory, and the News Print Service Bureau. During the present year the co-operation of the Woodland section of the American Paper and Pulp Association. Much valuable information has already been obtained and further reports will be submitted to the Technical Association as the work progresses.

Recommendations

The Committee believes that its main function in the future should be to assist the regular standing committees to take up problems dealing with the elimination of waste in their respective fields. The Committee should act as a co-ordinating medium with such organizations as the Forest Products Laboratory and the Bureau of Standards in order to make available the results of their findings. The Committee should also assist these agencies to continue their co-operative studies on waste elimination problems at the various mills interested in this work.

The Dorr Saveall

By M. C. Fleming

The actual operating data that has so far been obtained on the Dorr Saveall operation and some general information regarding its construction and operating features.

Drawing NY 602/4 shows the general operating arrangement of the first two installations of this machine. This installation arrangement, which shows the saveall located in the mill beneath the papermachine, however, need not be always adhered to as it can be located at the same elevation as the papermachine or above it. In such cases the waste water would have to be pumped to the saveall but the recovered stock would be returned by gravity to the papermachine or the process.

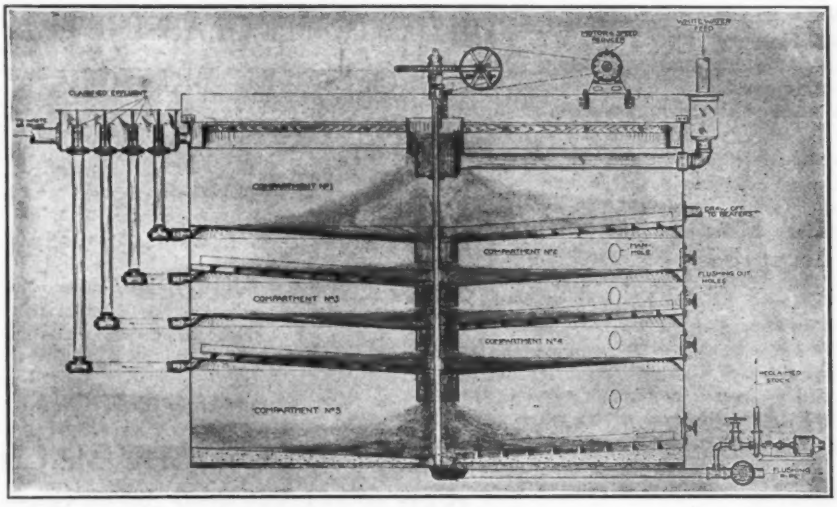
Special sweepers attached to the arms in each compartment thoroughly clean and prevent any accumulation.

Power Requirements

If the saveall is driven from a line shaft ½ hp. taken from the shaft is sufficient for its operation. If a separate motor is used, however, a 1 hp. motor should be used.

Attention and Repairs

Once put in operation the saveall requires no attention other than daily oiling. There are no screens to wear and all parts are of substantial construction. It is doubtful if any repairs or replacements of parts would ever be necessary.



LEGEND

ARROW SHOWS FEED OF WHITE WATER ENTERING FROM PAPER MACHINE ABOVE

IT FLOWS TO THE CENTER AND DISTRIBUTES ITSELF TO EACH COMPARTMENT WHERE THE SUSPENDED STOCK SETTLES AND THE WATER OVERFLOWS THROUGH THE OPENINGS IN THE INVERTED PERIPHERAL LAUNDER

RADIAL ARMS, WITH SQUEEGEE BLADES, REVOLVING SLOWLY WITH THE CENTRAL SHAFT, SWEEP THE SETTLED STOCK TO THE CENTRAL OPENINGS

THIS IS CONTINUOUSLY REMOVED THROUGH THE BOTTOM DISCHARGE CONE AND SENT BACK TO THE PAPER MACHINE AS RECOVERED STOCK BY A SMALL CENTRIFUGAL PUMP

The Dorr saveall is so arranged that it can be considered as a number of shallow settling tanks or compartments, one above the other, each with a peripheral outlet arrangement for the clarified water but with a common central feed. There is also a common outlet in the bottom for the slurry containing the recovered stock. Each settling compartment has a slightly sloping bottom and is equipped with slowly rotating arms to which plows are attached which collect and move the settled stock to the center.

Actual Operating Data

The following figures are the average of several months of continuous operation.

	Lb. per M. Gal.	% Stock in Effluent
Feed	.10	0.12
Clarified effluent to waste	0.32	0.004
Recovery	97 per cent	

The machines on which the above data was obtained are each handling approximately 240,000 gallons of white water per twenty-four hours.

On account of the slightly sloping bottom in each compartment and the small doors on each side it has been found that 10 minutes of a man's time with a hose is ample to thoroughly clean the machine when it is necessary.

Size and Capacities

It is difficult to figure the size of saveall necessary for any definite tonnage of paper produced by paper machines and that the size is more dependent on the gallons of water to be handled per twenty-four hours. Below are the capacities of different sizes of 4-compartment savealls.

Diameter Ft.	Capacity Gal. per 24 hr.
10	240,000
12	320,000
15	500,000
18	750,000
24	1,300,000

These capacities will vary some according to the settling qualities of the stock and the amount of stock in the white water.

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Hoffman Roller Bearings in Paper Making Machinery

By D. E. Batesole*

Without doubt, the greatest problem today in the operating branch of any industry is the problem of obtaining increased efficiency from the plant equipment and of reducing maintenance costs. This problem is, of course, receiving its proper share of attention in the papermaking industry, and for that reason the subject of anti-friction bearings is of extreme interest at the present time to everyone connected with plant operation.

Unusual Requirements

We have found in studying the application of roller bearings to the paper machinery field that there are certain requirements for a roller bearing which are not found in the ordinary application in other fields. There are, of course, the usual requirements of smooth running, sufficient load carrying capacity and resistance to shock, as well as ability to operate with little attention in the way of lubrication, etc. There are, however, a number of other features which are also quite necessary.

In the first place, there is the matter of keeping out the water from the running parts of the bearing. The working surfaces of a high grade bearing are, of course, very highly polished and easily corroded by rust, so it is very important, particularly on the wet end of the machine, to see that a good protection is provided against the entrance of water.

Secondly, we have found that in general the bearings should be self aligning, or should be mounted in self aligning boxes of some sort. This is for the reason that the frames are usually located a considerable distance apart, and it is almost impossible to line up the bearing housings properly.

Again, we find that a heavy overload capacity of the bearings is desired. Our experience has shown that ordinary calculations for loading do not give the real load conditions, and for that reason a bearing which has a very heavy load capacity for its size is more apt to give satisfactory service. Furthermore, since the operation of the bearings is usually continuous they must be selected with greater care than if the service were intermittent.

Short Roller Type

The Hoffmann precision roller bearings is of the short roller type, having rollers made to the same length as their diameter These proportions we have found from years of experience to be the best, as the rollers are long enough to give the required load capacity, but at the same time they do not offer any possibility of their ends being chipped off. The standard type of this roller bearing is made up to interchange with the present day S. A. E. standards of ball bearing sizes. The rollers and rings are made of uniformly heat treated alloy steel, and extremely close tolerances are used throughout their manufacture. This is evidenced by the fact that the rollers themselves are held to tolerances of 0.0001 inch in diameter and 0.002 inch in length. This close tolerance insures that the load will be well distributed over a number of rollers and the bearing will have a greater load capacity for that reason.

The retainer, or, as it is commonly called, the cage, is made of brass, completely machined and, therefore, well balanced. It is made in two pieces riveted together. There is no tendency for these rivets to separate because the pressure which the rollers exert against the retainer is in the direction of their rotation and consequently no sidewise pressure is exerted to separate the two halves of the retainer.

It will be noted that this bearing has a straight cylindrical section of outer raceway and, therefore, carries no thrust load. While we are able to supply it with lips in the outer ring, which make the bearing self-contained, if the thrust load is large we recommend the use of a ball thrust bearing or a deep groove ball bearing of the usual type in conjunction with it to take care of this thrust load.

A Number of Other Types

In addition to the standard type described above, there are a number of other types of these roller bearings, and one of these in particular we have found to be best suited for use in the paper making industry. This is known as our RSW type. It is a self-aligning bearing, consisting of the complete roller bearing with the outer ring ground spherical and fitted into a spherical outer shell. Furthermore, a patented feature of this bearing, and one which makes it very desirable where moisture and dirt are liable to enter, is the use of self aligning side cover plates.

The fact that the cover plate is permitted to align itself with the shaft makes it possible to use a very close running clearance between the bore of the cover plate and the shaft extending through it. This may be held as close as three-thousandths of an inch. By use of these cover plates the necessity of using a felt protection is eliminated, and it has been our experience that the felt protection is a source of trouble unless the felt is of the proper grade and carefully installed. We have mounted many of these bearings without any protection beyond the plates themselves and find that no water or dirt enters, when a close running clearance is employed. This bearing is particularly suited for use where a change is to be made from sleeve type bearings to roller bearings, as it is not usually necessary to provide elaborate protecting cover, other than those furnished with the bearing. In mounting them one bearing should be clamped tightly endwise while the other should be allowed to move with expansion and contraction of the shaft.

Renewal of the Lubricant

To permit of the renewal of the lubricant whenever it is required, it is only necessary to remove the machine screws which are in each cover plate and insert the oil or grease through these openings. The bearings should not require lubrication oftener than once each month, although the time between oilings will depend to a considerable extent upon operating conditions.

The RSW type of bearing, just described, has been used very successfully on the breast rolls, wire rolls and wire stretch rolls of machines of the high speed type. The housing employed in this case is fitted with the usual side cover plates, but no felt protection is used. Any water which enters the housing is drained out at the bottom and has no chance of entering the secondary protection; in other words, the cover plates which are built into the bearing.

There are a number of other types in which the Hoffmann roller bearing is furnished, including rigid bearings with tapered bores and adapters, as well as self-aligning bearings of the same type. The kind of bearing to be used, of course, depends upon the conditions of operation and design, and it is recommended that our engineering department be consulted in all cases where bearings are to be applied.

*Mechanical Engineer, The Norma Co. of America.

STUDIED USES FOR PARCHMENT

Ezra Levin, of the technical and experimental department of the Kalamazoo Vegetable Parchment Company, has returned from a six weeks' stay in Washington, where he has been actively engaged in making a study of uses for parchment and wax papers.

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Papermaking Opportunities in the South

By Chas. A. McKeand*

The object of the Seaboard Air Line Railway exhibit at the second annual Paper Industries Exposition is to present to those interested in the development of pulp and paper industry the opportunities to be found in the South for further expansion of the industry.

It would be useless for me to go into a technical discussion of the manufacturing of paper from various types of Southern timbers. You are all aware that during the past few years there have been many successful mills launched in the various Southern states engaged in the manufacture of kraft papers. You are no doubt aware of the development carried on by the U. S. Forest Products Laboratory at Madison, Wisc., and by individual paper engineers and chemists for the development of magazine, book paper, cardboard, wall board and other types too numerous to mention.

In our exhibit at Grand Central Palace we have on display samples of book paper made from a combination of pine and gum, and the pulp panel which we have for distribution embraces the processes used in the production of this pulp. It is therefore useless for me to go into the explanation of the processes. I wish rather on this occasion to present to you the broad features of the South from a manufacturing standpoint. In doing so I wish to discuss the following fundamentals: 1, the availability of raw material; 2, power; 3, markets; 4, labor; 5, climate.

Materials

Under the subject of materials, you will find on the map at the Seaboard exhibit that there are twenty-six places located at various points on our rails offering pulpwood material in sufficient quantities for the location of a pulp and paper mill. By sufficient quantities I am speaking in millions of cords. I have picked places where there is in sight at least 10,000,000 cords contingent to these points figuring future supply.

The average growth of pine in the six states traversed by the Seaboard, namely, Virginia, North and South Carolina, Georgia, Alabama and Florida, is such that timber will re-grow to a pulp size in twenty years. I mean by pulp size those from 6 inches in diameter up. The manager of the pulp mill at Hartsville, S. C., stated that from a timber tract close to their mill on which an intelligent logging process had been in vogue, his company had taken an average of 10 cords per acre, three times in 15 years. Almost any of the cut-over pine lands of the Southern states over which lumbering operations have been conducted, offer unlimited possibilities for the re-growth of pine pulpwood supply. The low marshy lands of our coastal rivers afford a plentiful supply of rapidly growing gum wood, and on the hillsides and in the river valleys of the Southern states are found various other types of hard and soft woods suitable for various phases of the industry.

Never Ending Source of Supply

Not only will our timbers in the South reproduce more rapidly than in other sections of the United States, thus eliminating the necessity of a mill organization carrying a large timber reserve, but the farms of the South will be found a never ending source of pulp supply, practically every farm in our territory being largely timbered, and the farmer will be glad to avail himself of the opportunity during the winter months to cut and deliver to the mill cord wood receiving a cash payment, which will add greatly to his farm income and help him in carrying on a well balanced farming enterprise.

Practically all the smaller mills now existing in the South secure their entire pulpwood supply in this manner, and they have never experienced a lack of a plentiful supply.

Yield Per Cord

Not only does the timber re-grow rapidly, but the yield per cord for the various types of Southern woods is greater than that of Northern woods. I quote the following figures to substantiate this claim:

	Pulp yield lb. per cord
Southern woods:	
Loblolly pine—Sulphate process	1,420
Mechanical process	2,450
Long leaf pine—Sulphate process	1,600
Short leaf pine—Sulphate process	1,450
Slash pine—Sulphate process	1,650
Black gum—Soda pulp process	1,300
Mechanical process	2,600
Northern woods:	
White spruce—Sulphate process	1,150
Yellow poplar—Sulphate process	1,170
Red gum—Sulphate process	1,190

Kaolin and Rosin Sizing

In addition to the plentiful and continuous supply of pulpwood the South offers other materials for use in the pulp and paper industry, such as kaolin and rosin sizing. The kaolin mines of Georgia are among the finest in the world, and a great many of you are thoroughly familiar with the clays produced in these mines. We have on exhibit at our booth samples of clay from the famous Dry Branch District of Georgia, the samples having been furnished us by Moore & Munger, operators of these mines.

Rosin.—The naval stores industry of the South produces your rosin sizing. An intelligent turpentining operation on growing pulpwood will increase the revenue per acre of your timber holdings and give you an adequate and profitable crop in rosin, turpentine and rosin sizing. At the completition of such operation, you still have available the original wood for pulp supply. A sample of rosin sizing is on exhibit.

Power

The second item of importance in this industry is that of power. The South has assumed the leadership during the past few years in the development of her water power resources. The streams of the Southern states have a potential 7,000,000 hp. of which only 1,500,000 has been developed. Through a plan of interconnection, the various power companies have formed a superpower zone, making it possible to transmit power through these connections from one section of the South to another, thus affording us a quantity of power unequaled in the United States. For heavy load machinery such as is required in the pulp industry, the Southern hydroelectric power offers attractive inducement. At those places out of the power zone but suitable for the location of a mill, because of the accessibility of raw materials, we have through our various Southern ports splendid service for the delivery of fuel oil. The coal fields of Kentucky, West Virginia, Tennessee and Alabama offer an unlimited and unending supply of coal for industrial purposes, produced at a figure delivered at the mill which is indeed attractive to the industries. You know that coal delivered at $5.50 to $6 per ton is very attractive in comparison to coal delivered for $10 to $12 per ton as in the North.

*Seaboard Air Line Ry. Co.

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Markets

Keen students of the market problem are fully aware of the movement westward of the purchasing population of this country. Points in the South are closer to the great purchasing centers of the Middle West through the Ohio and Mississippi gateways than are the mills of New England and Canada, and at the same time it is a shorter haul to the Northern markets of the East from various Southern points than it is from the mills of Michigan and Wisconsin.

An item in connection with this is the fact that the rail delivery to the central purchasing sections from Southern points would be over rail lines less congested with traffic than those from the East, thus assuring more prompt and efficient delivery at less cost.

The great ports of the South Atlantic and Gulf make possible the shipping coastwise by water of the product of your mill, or the shipping by water to the Pacific Coast, thus affording you a decided advantage over the mills located in the East and North that use a long rail haul.

In addition to the transportation facilities for delivery of your product to the markets of the central East and North, I call your atention to the fact that the purchasing power of the South itself has increased 40 per cent in the past ten years, and if the curve projected into the future reads aright, the South will see a 100 per cent increase in its purchasing power in the next ten years.

Labor

In discussing labor, I am discussing the South's greatest assets. There has grown up an erroneous impression among the Northern people as to our Southern labor. I wish to call your attention to two classes of labor which we have, both of which is especially attractive to your type of industry. First is the white labor, all of which is native born Anglo Saxon, possessing a high degree of native intelligence, true to American principles which predominated this country fifty years ago, and a class of labor which will give you high production and an honest day's work for its wage and be loyal to the organization for which it is working. I submit the following figures regarding our foreign born stock in the Seaboard states in comparison with the New England states:

State	White Population	Total Foreign Stock %
Alabama	1,447,032	2.2
Florida	638,153	10.9
Georgia	1,689,114	1.6
North Carolina	1,783,779	0.7
South Carolina	818,538	1.0
Virginia	1,617,909	3.0

In the South a man, such as I have been describing above, gives you two weeks' notice when he is going to quit, and if you wish to discontinue his services you give him notice. Compare this, if you please, with the sudden determination on the part of the highly unionized radical type of labor in your Northern mill which decides to lay its tools down and quit without notice.

The labor such as I have been describing works a 55-hour week in the Southern states. The other class of labor in the South which is attractive for an industry of your type is the negro labor, which would be used in the logging operations and the heavy manual work around your mill. This type of labor under the direction of a man who knows how to handle them will give you good results. I have seen a man from the sunny shores of Italy in a wood yard in New York pulp mill take longer to do a given job than I ever saw a negro in a Southern mill. I think those present representing Southern mills will bear me out in the statement that they have, on the whole, found this type of labor satisfactory.

Climate

Climate is the fifth fundamental necessary to your industry which offers an attractive Southern inducement, a climatic condition which makes it possible to work the year round. A climatic condition which eliminates the necessity of spending, as in Northern and Canadian mills, 40 to 50 per cent of your coal bill for heating purposes in the winter. A climate which eliminates the necessity of erecting expensive buildings. No doubt you have the impression that our Southern climate is enervating and as a result of our hot summers we have a high death rate and a great deal of illness, and resultant decrease in production. On the contrary, I quote you the following figures from the Weather Bureau, giving the normal, mean temperature ranges, as follows:

Location	Mean °F.
Atlanta, Ga.	from 42.2 to 77.6
Birmingham, Ala	from 40.3 to 92.6
Sanford, N. C.	from 41.6 to 79.4
Columbia, S. C.	from 43. to 79.1
Jacksonville, Fla.	from 41. to 75

How can climate be enervating with such ranges as this? This is further proven by the fact that the combined death rate per thousand for the six states traversed by the Seaboard Air Line Railway is 11.6 per cent as against 12.1 per cent for New York and the New England states.

Climate has another angle of interest to you. Your labor is able to get to work every day in the year. They are not shut in by long, drab, winter days. Your logging operations can go on the year round. And as labor can produce most of its own food, due to long growing seasons, and wear less expensive clothing, labor costs will be resultantly lower.

In closing, then, I would summarize the Southern possibilities as follows:

Under the heading of Materials—a plentiful supply now standing, with climatic and soil conditions such as would give, under an intelligent reforesting program, a reproduction of timber of pulp size within twenty years as against eighty years or more in the North, thus giving you a four-to-one shot to eliminate the necessity of a large investment in timber reserves. A higher yield per cord of wood plus the close proximity of other materials necessary to the finishing of your product.

Power

Cheap hydro-electric power, 99 per cent continuity of service. Fuel oil for steam power purposes, plus the unlimited Southern coal fields making possible good steam coal at reasonable figures.

Markets

A rapidly growing local market—short rail hauls to Central and Northern markets and splendid facilities for water transportation through our many ports.

Labor

Energetic, white, Anglo Saxon strain, loyal and possessing native intelligence. No labor troubles and no "isms." A good day's work for a reasonable wage. Plentiful supply of colored labor for pick, shovel and saw jobs.

Climate

Productive of health, low operating costs, and high productivity.

The combination of these five fundamentals will enable you to produce goods at such a price, that regardless of market conditions, you will always be able to keep the output of your plant sold, manufacture in contentment and at a profit.

ST. MAURICE CO.'S EARNINGS

The annual statement of St. Maurice Paper Company, of Three Rivers, Que., for the year 1923 shows an increase in operating profits from $696,000 to $1,253,000 in one year and justifies the general opinion now held as to the strength of the manufacturing position of this company. Allowing for depreciation, these earnings left $1,040,050 available for dividends, compared with $445,076 one year ago, or 12.75 per cent on the increased capital, compared with 5.63 per cent on the smaller capital of 1922. This increase in profits was due mainly probably to an unusually favorable market that developed for groundwood pulp during the year.

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The Importance of Good Rolls

By James A. Cameron*

The contents of a package are often judged by the outside appearance. If the package is carelessly put up, it is a fair assumption that not any too much care was used on the goods inside. That is the customer's impression, and on the average he is apt to be right. The exceptions to this average are apt to occur in the kind of goods we are most interested in—paper of all kinds, especially paper in the form of rolls.

Paper is delivered to those who utilize it packaged in bundles of sheets or wound up into rolls. The general appearance of the average bundles of sheets is fair to good. The average rolls are fair to bad. The paper in the rolls is apt to be good, as the average producer of paper is both efficient and honest, but the appearance of the roll may, and often does, discredit the quality of the paper.

Modern Demand for Paper Rolls

Modern demand for rolls in increasing tonnage and variety of sizes, and especially for rolls which are perfect as rolls, aside from the actual quality of the paper, has caught the producer and converted of paper unprepared. His first impulse is to try to get really good rolls out of his present equipment of roll-winders, which are oftener than not of a design antedating the high standards of modern roll requirements.

There is a bewildering lot of roll-winders, each varying from the other in fundamental ways, some doing the slitting operation in one way, some in another, by a hit or miss choice; some doing the winding of the rolls on a friction driven mandrel, and others by surface contact with one or two or four drums.

There is no time here to analyze and compare various ways of slitting a web of paper down the length, or ways of winding up the slit sections into rolls. These subjects have been discussed at length in illustrated pamphlets; one, "A Study and Comparison of Methods of Slitting and Winding Rolls of Paper and Board," with special reference to the merits and demerits of winding methods in use. the other pamphlet, "Slitting Methods Compared," deals more particularly with a comparison and appraisal of slitting methods per se.

Both of these pamphlets are available, gratis, to anyone wishing to give this subject—"The Importance of Good Rolls"—further consideration.

Importance of Good Rolls

The thing we wish to look to here is the importance of good rolls both to the producer and the consumer of the paper.

Rolls which do not do justice to the care and skill and honest effort of the mill men who have produced good paper, are "kill-joys" and profit-killers as well, for they make the selling the harder and invite the risk of claims. Furthermore, defective rolls mean defective roll-winders, and a defective roll-winder is about as swift and sure a way of piling up broke as the devil himself could devise.

Defective rolls in the hands of the consumer slow down his production in any one of the numberless manufacturing purposes for which roll-paper is employed. Defective rolls cause dissatisfaction which the consumer is not slow or any too gentle in expressing; and having started on the rolls, he often begins to look for real or fancied defects in the paper itself.

The importance of good rolls cannot be over emphasized.

It takes a good roll-winder to make good rolls, and it is invariably true that a good roll-winder is also an economical one in labor and broke. It is actually cheaper to produce good rolls than poor ones. Furthermore, the consumer of the paper will gravitate towards the source of supply where good rolls as well as good paper can be had.

The customer in the old days was not over critical as to the character of the rolls themselves so long as the quality of the paper in the rolls was all right. Mechanical processes of modern invention for converting paper into its many products, as they multiplied in number and increased in speed, became more exacting in the matter of accurate width of the paper, clean cut edges, firm and even rolls, absence of wrinkles and other defects in the surface of the paper. The production of these rolls to meet the consumer's specification has come to be quite a problem with the paper manufacturer.

Customer Now Critical

The customer to-day is necessarily critical as to the kind of rolls he receives. His preference for accurate rolls arises from the fact that rolls which are smoothly and evenly wound, perfectly round, firm and true and clean cut on the edges, and free of wrinkles, permit a higher speed and a lower percentage of broke on machines to which they are fed.

Aside from the customer's actual necessity for accurately formed rolls for handling to best advantage, he also has a natural preference for rolls of good appearance. When he sees a good appearing roll he is more apt to have increased confidence that the paper is O. K. also.

In the face of these facts, it is little short of amazing that the average paper manufacturer will try to get along with old style and incompetent slitting and roll-winding machines. In some cases the mill has been practically rebuilt from the boiler room to the paper machine reels, but this remodeling and improvement has stopped short there at the reels, leaving the old winder peacefully undisturbed to plod and plug along as best it can.

It is for those interested in the production of roll paper to inquire whether it is good business policy to be content with roll producing equipment less efficient than the standards they would like to reach and which their customers would like to have them reach, especially as the production of practically perfect rolls by an efficient machine is at less cost than the opposite condition where inefficient machines are used.

Market for Roll Paper Here to Stay

The market for roll paper is here to stay. The production of roll paper by inadequate equipment is expensive and ill-advised, and the mill salesmen who have faultless paper to offer in poor rolls are sometimes worse off than salesmen who have less quality in the paper and more quality in the rolls.

The designing and building of slitting and roll-winding machines is a strictly specialized branch of paper mill equipment; and with the sole exception of Cameron Machine Company, there has been no concern specializing wholly in this class of machinery.

But now that most of the fundamental problems of paper-making are mastered, the time may have come when the practical mill man will mobilize his skill and experience in investigative and critical sizing up of his winder troubles. We believe, my associates and myself in Cameron Machine Company, that a close study of the technique of slitting and roll-winding will lead to the adoption of the theories and practice developed by our company and built into its machines. For years past, these machines have been gaining the approval of a constantly widening circle of practical and technical mill men.

In the last analysis there really must be one best way of performing the slitting and roll-winding process for the economic production of good rolls of paper and other materials. With the importance of good rolls clearly realized, we can safely leave it to the resourceful men of the mills and factories who are called upon to produce them, to approve and adopt the most practical method.

* President Cameron Machine Co., Brooklyn, N. Y.

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A FOLDER, showing interesting examples of printing on several grades of New York & Pennsylvania Company's CLARION Papers, will be sent upon request.

The Most Efficient Type of Bearing for Paper Machinery

By Geo. H. Spencer*

Generally speaking, every revolving element in this world must be supported on bearings. The ease, reliability and efficiency with which a shaft revolves will depend, to a large extent, upon the bearings. So much trouble and loss of production has occurred at all times on machinery due to the non-performance of the ordinary plain bearing that it is a wonder that the possibility of using a more efficient bearing, both from a standpoint of endurance and economic operation, has not been more apparent until recent years, particularly within the past ten years.

This compelling need has been solved by the development of what is known as the anti-friction bearing. But, before explaining and describing the functions and operations on paper machines of the anti-friction bearing, which may be either of the ball or roller type, it might be well to review for a moment the construction of the aforementioned plain bearings.

Plain Babbitt Bearings

The plain bearing supports the load on an oil film, its operation and friction depending upon those conditions which effect the maintenance of an oil film such as load, speed, oil viscosity, (hence temperature also). Again, in the case of paper machines whenever the oil film is broken down due sometimes to shock loads, such as is present on paper beaters, or whenever the lubricant is disintegrated by the chemical action of the lubricant with water or alum, such as happens on a breast roll, there exists for a moment and sometimes longer the condition of a metal to metal contact over a proportionately large area which condition, as we all know, causes heating due to friction, wear and often time immediate replacement of the bearing.

The plain bearing, therefore, requires constant attention and inspection. Even the most elaborate designs do not entirely eliminate the possible rapid increase of friction and the danger of seizing.

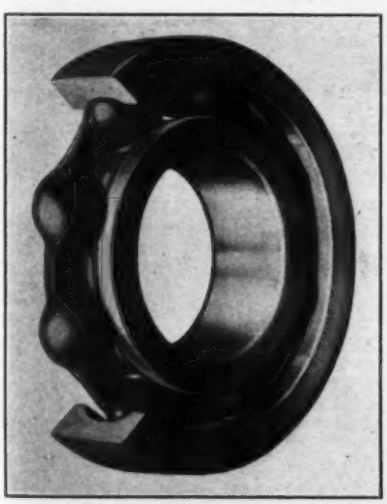

FIG. 1
Single Row—Deep Groove Bearings

I am now going to tell you something to think about.

There are 24,500 miles per year of rubbing friction in the two plain bearings of a 20 in. diameter lower press roll of a newspaper machine operating at 750 feet per minute with a journal diameter of 8 in. during working hours (7,200 hours per year). Thus, this distance will take us just about once around the world. We have then 12,250 mile films of oil that must be maintained continuously over that double track representing the bearing sleeve throughout the year. If a single mile is missed the bearing will burn out and production stops.

Anti-Friction Bearings

The ball or roller bearing, on the other hand, is actually designed to carry the load on a metal to metal contact instead of an oil film and it is, therefore, largely independent of those operating conditions which seriously effect the plain bearing. The friction of a ball or roller bearing varies but little over the entire range of load and speed. No matter what happens to the lubricant the bearing will continue to operate as long as the metallic surfaces are not impaired. The ball or roller bearing is, therefore, less liable to sudden trouble and provides a dependable and steady bearing operation.

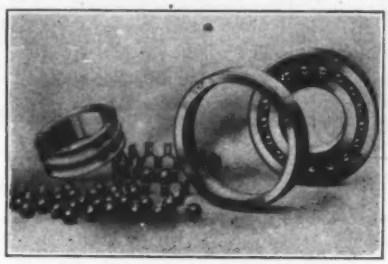

FIG. 2
Double Row—Self-Aligning Bearings

The continuous wear in plain bearings cause larger maintenance costs than necessary. Take for instance, the cylinder mold—the brasses have to be replaced quite frequently and many times before replacement occurs there has been a felt or two lost because the rolls were out of alignment. The primary cause of misalignment is due to the inability of the bearings to hold their centers. Only recently have paper men realized the increased advantages to be derived from giving minute attention to alignment of bearings.

1—Centering and straightening of bars and tubes.
2—Outside turning of bars and tubes.
3—Boring of forgings.
4—Inspection.
5—Automatic turning of bars or tubes.
6—Turret turning of forgings.
7—Inspection.
8—Spherical turning.
10—Chamfering.
11—Inspection.
12—Hardening and tempering.
13—Inspection.
14—Surface grinding.
15—Inspection.
16—External grinding.
17—Internal grinding.
18—Inspection.
19—Spherical grinding.
20—Groove grinding.
21—Inspection.
22—Polishing outer rings.
23—Polishing inner rings.
24—Inspection.
25—Assembling.
26—Inspection.
27—Greasing.
28—Wrapping.

FIG. 3
Shop Operation—Manufacturing of Rings

When you think that the high maintenance expense of a Jordan is due mostly to the wear in a plain bearing with a consequent drop of the plug and an unequal wear of the knives at the bottom of the

*Member TAPPI. In charge of development work for Pulp and Paper Industry for SKF Industries, Inc., New York City.

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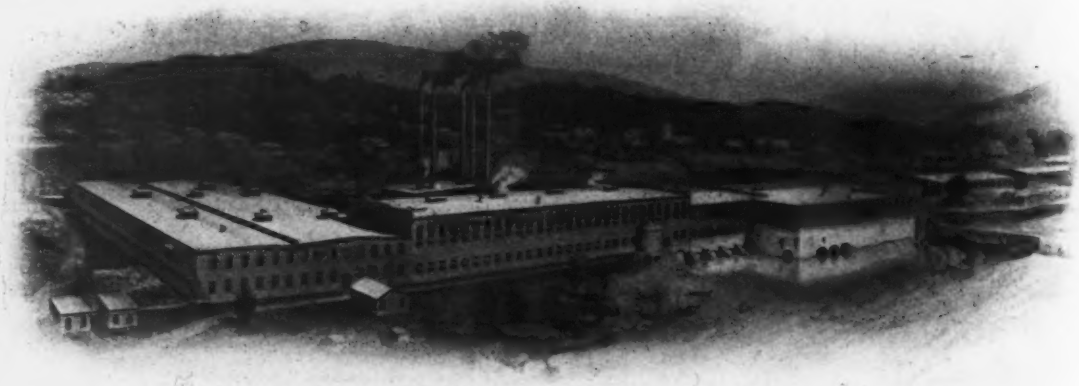

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shell, and when it is further realized that the chief reason for changing the knives is because of this wear, then it is time for the paper mill owners, superintendents and engineers to investigate the characteristics of the anti-friction bearing.

It may be well at this time to give briefly an outline of a certain phase in the manufacture of anti-friction bearings which will give an idea of the workmanship incorporated in a bearing designed primarily as a piece of mechanism to carry a given load at maximum efficiency with the least possible friction. When people talk breathlessly of the "hair's breadth" escape, the inference is that only the narrowest kind of a margin is interposed between them and disaster, but after a journey through a modern anti-friction plant one decides that the proverbial "hair's breadth" seems as big around as a boa constrictor compared to the accuracy demanded there.

As shown on Figs. 1 and 2, a ball bearing consists of two rings, balls and a ball retainer; the manufacture of the rings being our chief interest for the moment. To the uninitiated, the manufacture of a ball bearing might, at first, be thought a very simple process consisting of machining or forging rings from steel bars and assembling the balls and rings to make the complete unit. Not so, however, the making of a ball bearing is the most intricate, careful, slow and accurate process.

The raw material is received at the plant in the form of bars and samples about 5/16 in. wide are cut from each end of each bar. Physical, chemical and microscopic tests are made of each piece cut off and if any flaw in the metal is discovered two more samples are taken one foot in from each end of the bar. If further tests show that flaws exist the bar of steel is rejected. There are three methods used in securing rough rings for bearings, the most interesting being the forging process. In this process steel bars are first heated in oil fired furnaces from which they emerge red hot and are ready for the forging machine. After passing through these machines the rings are put in an annealing oven and then through a sand blasting process to remove the scale and to leave them in a clean condition to start machining.

You will note from Figs. 1 and 2 that each ring has a number of different surface to be machined. There is the inner and outer surfaces as well as the two side surfaces. There are ten machine operations and for each operation there is a different operator scholed in machining the rings down to within two to eight thou-

FIG. 4
Grinding Room

sandths of an inch accuracy. Each machine is equipped with an air chuck. As they are being machined the rings are bathed in a steady stream of oil solution. The operator inspects the finished rings by means of various special measuring devices.

Fig. 3 shows the complete manufacturing process for rings or races of a ball bearing.

Shop Operation—Manufacture of Rings

It is highly important during the machining and grinding processes that the rings be inspected after every operation. One of the main reasons why a high grade ball bearing is not a cheap product is that it is as accurate and dependably fashioned as human resources and ingenuity can make it. So, if a ring which was improperly machined at the beginning went through all of the

FIG. 6
Inner Face Grinding

machining and grinding processes only to be rejected as imperfect in the end, it would be a tragic waste of labor, skill and equipment.

The machining puts the rings in shape for grinding. First, however, they are put through a hardening furnace and then quenched in an oil bath and then tempered to relieve the quenching strains in the metal. Then comes another inspection by means of an ingeniously devised testing instrument and the rings are ready for the all-important operation of grinding.

Fig. 4 shows a grinding room of a modern ball bearing plant. There are from five to seven grinding operations on each ring and a different machine and operator takes care of each operation. Inspection is rapid and frequent for here is where the sharpest and keenest accuracy is necessary. Rings which seem perfect even to the practiced eye are rejected when the testing instrument and gauges

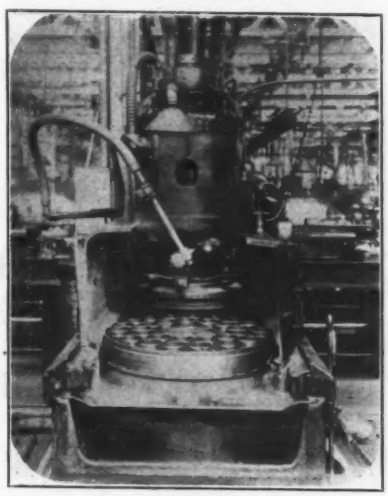
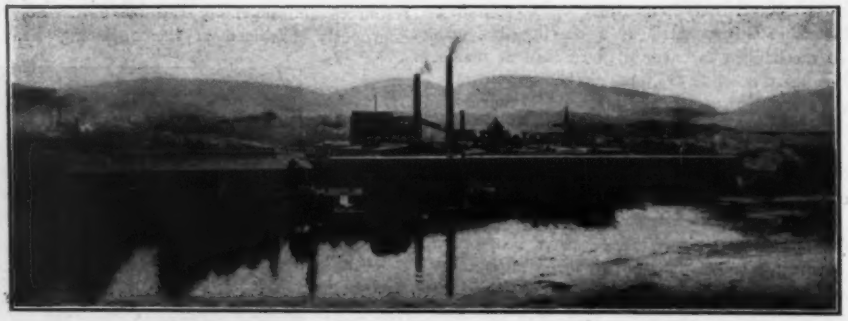


FIG. 5
Face Grinding

show a variation of one-half of one ten-thousandths of an inch over or under certain pre-determined tolerances.

As soon as grinding is complete the rings are slowly and carefully looked over for any possible flaws in the metal. The surfaces are lapped so that flaws are more easily detected at this stage. Sometimes a scratch or mark, which is merely a surface flaw may be



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eliminated by regrinding, but if it indicates any inherent weakness in the steel these rings are immediately rejected.

Fig. 5 shows method of grinding the sides of the rings which are held in a horizontal magnetic chuck. This operation is called face grinding. Fig. 6 shows a specially constructed machine imported from Sweden for grinding inner races. The wheel head is stationary and the wheel runs on ball bearings which accurately maintains and takes all chatter out of the grinding wheel while the work head carries between centers the ring that is to be ground. The work head is constructed so as to oscillate and can be adjusted to give the proper radius of groove of ring.

With all this skill, labor and watchfulness already expended to make rings perfect, it would seem that there was nothing that could be done. But, once the rings have passed through the processes mentioned, they are taken into a dust-proof room for assembly. The air in this dust-proof room is filtered and changed continuously. Here the rings are washed in a special solution and then carefully dried before assembly. Following the assembling operation all the bearings pass into the final Inspection Department where they are completely re-inspected and tested for smooth running as well as for many other characteristics.

Fig. 7 shows the use of gauges for measuring inner races.

Fig. 8 shows the use of gauges for measuring outer races.

Fig. 9 shows an eccentricity test.

Fig. 10 shows another method of determining eccentricity.

Fig. 11 shows hardness testing using a scleroscope. This test is a rough one and is used for checking purpose only. These are jut a few of the tests that each ball bearing goes through. I have tried to outline briefly the manufacturing processes of one of the vital parts of the bearing, to show more than anything else that the expense for labor would not be necessary unless there was a real good reason for it. An accurately made bearing means long, continuous and satisfactory service and on paper machines more than on any other place is the demand for a high quality bearing.

When the complete bearing is placed into service on a paper machine there is demanded a certain amount of intelligence and conscientious attention and care. We do not mean to convey the idea that the anti-friction bearing is a frail piece of mechanism, but invariably there is a certain amount of time that must be spent when anti-friction bearings are first installed and used by any mill in the study of the proper methods of lubricating, examining and cleaning of the bearings.

FIG. 7
Gauging Inner Races

Now, why all this discussion about the anti-friction bearing on paper machines? The answer is that within a few years ball and roller bearings will be the standard type of bearing used on paper machines. Already there is one machine entirely equipped with ball bearings from the breast to the reel. This machine is 166 in. wide and has been operating continuously for over a year. The machine was designed to operate at 700 ft. per minute and all of the bearings have done the work they were selected for without any failures or loss of time. This result could not have been attained had not the development of anti-friction bearings on paper machines followed only after the anti-friction engineer realized the complexity of the problem involved and investigated them extensively; and only after the paper industry, in turn, realized what advantages the ball or roller bearings offer for paper making machinery.

FIG. 8
Gauging Outer Races

FIG. 9
Eccentricity Testing

What should be expected from the use of ball or roller bearings on paper machines?

1. Reliability

Uninterrupted production is the uppermost thought in the mind of the paper factory manager. Each machine must make paper con-

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tinuously from Monday morning until Sunday morning. Every interruption of operation means loss of so many dollars and cents worth of paper that should have been turned out. Consequently, the one outstanding characteristic demanded of all paper equipment is reliability. There should be no breakdowns or stops for repair outside of the week-end shut-downs. Ball bearings have, therefore, been welcomed in the field of paper machinery because of their increased reliability, because they avoid the need of constant inspection and lubrication, and because once installed and properly protected they will operate continuously for years. This greater reliability has been appreciated in the paper industry perhaps more than any other single characteristic of ball or roller bearings.

2. Lower Friction

The low friction of a ball bearing or a high grade of roller bearing becomes prominent in paper making machinery in two ways; in reducing the power and in increasing the life of wires and felts. In the paper machine itself only a small proportion of the paper input is used for working the material; much of it is absorbed in friction at the bearings. For this reason the substitution of anti-friction bearings for plain bearings will produce unusual results. We quote the following reading from the switchboard of a 166 in. fourdrinier machine equipped throughout with ball or roller bearings including the wet end, two pairs of presses, seventeen dryers and one reel (no calendar). When making 14 lb. tissue at 400 ft. per minute the entire machine required 54 hp. at the switchboard, this includes all motor and transmission losses.

3. Increase Life of Wires and Felts

The ball bearing effects a considerable added economy by prolonging the life of the fourdrinier wires and felts. About two-thirds of the rolls on a paper machine are driven by the wire or felt that passes over them. In the fourdrinier section, for example, only the couch roll has a direct power supply and the wire itself drives all the other rolls. A large proportion of the wire and felt wear may be ascribed to the increased tension necessary to drive these rolls and to the friction and wear that takes place between the wire or felt and the rolls. The anti-friction bearing reduces the required tension and eliminates slipping at the point where the felt or wire drives the rolls.

The average life of a fourdrinier wire has been observed to increase anywhere from 20 to 40 per cent when all the rolls excepting the couch are changed over to ball or roller bearings. A similar saving is effected on the felts when the bearings are of the anti-friction type. Besides reduction in cost of wire and felts, fewer changes mean fewer interruptions in operation and lower labor charges for wire and felt replacement.

4. Smoother Operation

The low friction and smoothness of the ball bearing makes for a quieter and smoother operating machine. An inspection of the two types of bearings in operation will immediately indicate reduction in vibration. Thus, a greater life may be expected of the parts of the machine. Less vibration makes the frame, rolls and all moving parts less liable to trouble.

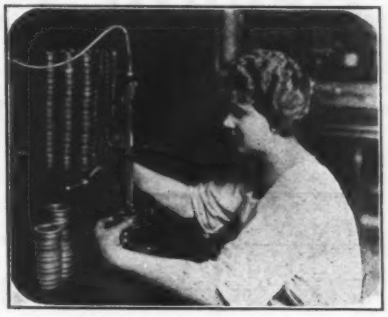

FIG. 11
Hardness Test

5. Increase Speed of Machines

The greater smoothness of operation and lower friction of the ball bearing makes greater speed possible in the paper machine. Of course, the bearings are not the only factor effecting the operating speeds. There are others such as the amount of heating surfaces, effect on the quality of paper and the advantages of handling. Ball or roller bearings often permit a small increase in speed depending upon these other conditions. We need not explain the importance of even a small increase in speed and the correspondingly accurate output of finished product.

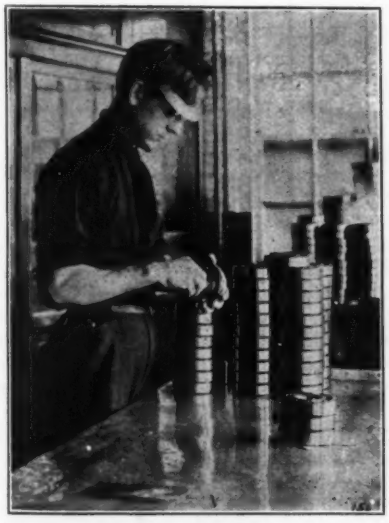

FIG. 10
Eccentricity Testing

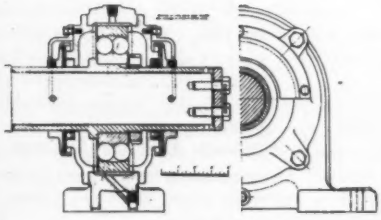

FIG. 12
Cylinder Mold Mounting

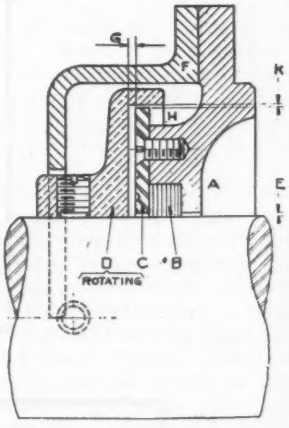

FIG. 13
Water Protection Grinding

6. Lower Starting Friction

The starting friction of plain bearings is very large, much larger than the running friction especially after standing idle as the lubricant is then squeezed out from between the metallic surfaces. In

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sharp contrast, the anti-friction bearing starts practically as easy as it runs. Thus, a ball bearing machine will get up to speed in less time than a plain bearing machine.

Again, because of the lower starting load the motors can be 15-30 per cent smaller for the same starting time thus reducing the initial cost of a new machine.

7. Greater Accuracy

In many locations the ball bearing is useful because it locates a shaft accurately; it has no appreciable internal looseness and develops practically no wear. This becomes valuable in such locations as the Jordan Engine where a rotating part requires accurate and maintained centerings.

In conclusion, there are three distinct problems in connection with the successful design of a ball or roller bearing application for paper making machinery as follows:

1. The selection of the quality, type and size of bearing.
2. The design of a bearing mounting that will permit various manipulations necessary for changes in wires and felts as well as various mis-alignments or frame movements that may occur.
3. The design of an enclosure to completely protect the bearing and to retain the lubricant.

8. Bearings More Effectively Protected

Ball or roller bearings, though fully as sensitive to foreign matter and water as plain bearings, may be far more effectively enclosed and protected from the intrusion of such material by suitably designed enclosures. The practically water tight housing seals made possible by the accuracy of the anti-friction bearings are of great value to the paper machine where water continually splashes over everything and where the machine is washed out with a hose.

Fig. 12 shows a ball bearing mounting for a cylinder mold with the proper protection against water.

Fig. 13 shows a detail of the design of the end covers, felt plate, water flinger and shroud, all of which combine successfully to keep water and dirt out of the housing.

These enclosures not only exclude water and dirt, they also retain the lubricant. No lubricant leakage means no clogging of the fourdrinier wire and no oil spots on the stock. The use of grease instead of oil aids considerably in this respect. Furthermore, the lubricant need not be replenished frequently where there is so little leakage and so little deterioration due to the intrusion of foreign matter or water. If a liberal space is provided within the bearing housing, the bearing will operate from 2 to 6 months without fresh lubricant. A specific example will illustrate how little attention to lubrication is required by ball or roller bearings. One ball bearing machine having approximatey 500 bearings requires 27 gallons of lubricant initially, this lubricant was not disturbed thereafter for five months.

All of these problems have met with success and in a paper presented by Mr. DeMott of SKF Industries, Inc., before the Technical Association of the Canadian Pulp & Paper Industry there appears a complete presentation of the housing designs which have proven to be reliable and effective.

White Water Economy

By L. M. Booth*

White Water Economy—What is it? The answer expressed in terms of "the truth, the whole truth, and nothing but the truth" is—use it all.

By many experienced paper makers this scheme is considered an idle dream or a fond hope. On the other hand there are a number of mills where this procedure has been adopted following a diligent search for possible objections to such a plan.

Stated in the simplest terms, the manufacture of paper consists in the separation of solids from the liquid portion of a water suspension of the stock. In common with all processes, perfection has not yet been attained, so that as practiced on the familiar fourdrinier or cylinder machine, the separation is incomplete. The water which passes through the wire carries with it some of the stock, hence white water is produced. The long continued presence of the stock in the white water has an unfavorable influence on each of the components, in that the stock decomposes and in so doing, contaminates the water with the products of decomposition. It is therefore under certain conditions unfit for reuse.

Since it is apparent that 100 per cent efficiency in stock and water separation is not attainable by the paper machine alone, a supplemental process must be sought as a means of further separation.

White water usually carries from 0.83 to 8.3 lb. of stock per 1,000 U. S. gallons, equivalent to 0.01 per cent to 0.10 per cent consistency.

It is unnecessary to conduct extensive research to develop a radically new process, or to experiment with untried principles in order to solve the problem, because white water responds to the same general class of treatment that for years has been the standard method of water purification for municipalities, paper mills, etc., namely coagulation by chemicals, followed by sedimentation.

In many mills, it is the practice to settle by plain sedimentation, such of the stock as separates most readily, and to use this back in the process. This still leaves a relatively large volume of low consistency white water which must be promptly separated into its constituents, stock and water in order to use these to the best advantage.

Fortunately the separation of the stock and water is easily and effectively accomplished by chemical coagulation and sedimentation.

According to authoritative works on water purification, the ancient Chinese utilized aluminum hydroxide precipitates for clearing water of suspended matter. This use antedates the birth of fourdrinier by thousands of years.

It is thus apparent that man knew the principles of handling the white water, long before he had a paper machine with which to produce white water.

The ancient basic idea has been brought up to date, including the adoption of means particularly adapted to paper making needs. Use is made of a balanced, and complete coagulant whose constituents mutually react. The product of this reaction, aluminum hydroxide, entraps the fiber and other suspended matter so that these may readily settle and be separated from the water in a suitable settling tank.

Besides settling the stock, a freshly made precipitate of aluminum hydroxide has the effect to coagulate colloidal substances such as clay or resin which may thereupon be promptly returned to the paper machine. Because of the speed of handling, there is no opportunity for slime producing decomposition to occur. In some mills using the Boothal Coagulation Process, cleaner paper is being made than formerly due to the substitution of clarified white water for the regular mill supply of fresh water for beaters and showers.

The present state of the art of separation of pulp and water and their utilization in the manufacture of various grades of paper from tissue to boxboard is such that all of the stock furnished to the beaters may be delivered in the form of finished paper. Another important advantage is that by the utilization of the clarified water for showers, etc., it is possible for many mills to increase production without developing additional fresh water supplies. Some manufacturers are confronted with vexing stream pollution regulations. These have no terror for, and are automatically complied with by, those who have found that it is cheaper to save and use both constituents of white water, pulp and water, than to cling to conservation methods of yielding less than 100 per cent efficiency.

The only save-all that saves all is the system which uses all.

* Member TAPPI, Booth Chemical Company, Elizabeth, N. J.

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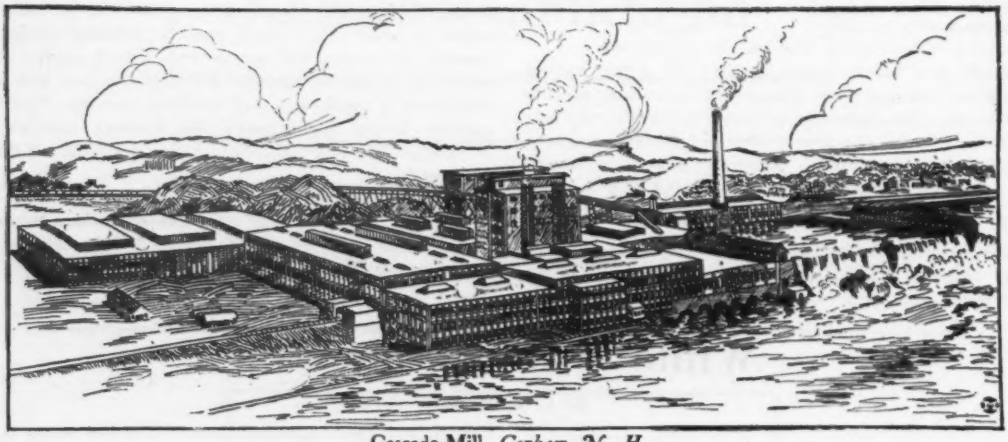

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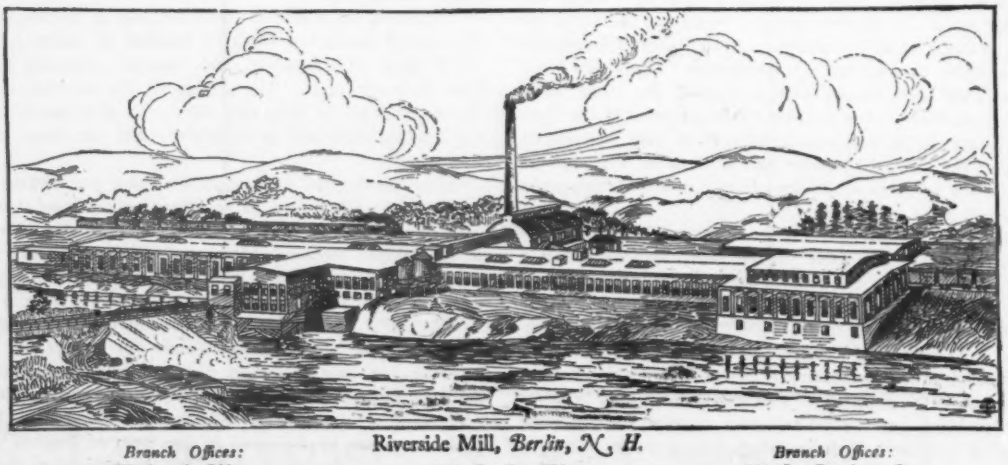

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Paper Manufacture As An Integral Industry

The List, Presented Here, of Operations and the Kinds of Equipment, Machinery and Supplies Called for By the Pulp and Paper Manufacturing Companies in the Conduct of Their Business Will Indicate the Breadth of the Industry and It Will Also Show Its Direct Contacts With Many Other Apparently Little Related Industries and Lines of Business—Classification of Paper Manufacture By Departments.

By William G. MacNaughton, Sec., Technical Association of the Pulp and Paper Industry

The development of the paper industry in North America in recent years has been such that many, even of those engaged in it, do not realize the extent of its present ramifications.

The appended list of operations and the kinds of equipment, machinery and supplies called for by paper manufacturing companies in the conduct of their business will indicate the breadth of the industry. It will also show its many direct contacts with other apparently little related industries and lines of business.

To a large degree the extent of the diversity is because of the supreme importance of wood as a raw material. As the demand for wood has increased with the enlargement of the industry it has become necessary to go further and further afield. Where spruce forests and abundant water power are to be found, even though far removed from the centers of population, there the paper mill is located. Thus we see the establishment not only of a pulp and papermaking plant but also of necessity a town for the workmen and their families.

Efficiency Demands Good Equipment

It has become well recognized that if efficient workmen are desired not only must the plant be well equipped but provision must also be made for the comfortable housing of the workmen's families, their health and education and for all the necessities of modern life. Where an industrial plant is the only industry it is the responsibility of the company to provide them. That they have done so is well illustrated by the thriving paper mill towns that have been developed in the past twenty years, through what were the wilds of United States, Canada and Newfoundland.

While to some extent papermaking is still a conversion process where the paper mill receives as its raw material the wood pulp which is the finished product of the pulp mill, or rags and waste paper which have been collected in the populous centers, it has very largly become a self-contained industry. This is particularly true in regard to the manufacture of news print which in point of tonnage is the chief single branch of papermaking. It is in news print, therefore, that we see the industry most widely expanded in the scope of its activities and contacts. There are not only the plants for the translation of water power into electricity but also large steam plants to supply the steam required in the pulp and papermaking processes. There are the plants for making mechanical pulp by grinding the wood, and the chemical pulp plants where the wood is cooked with chemical solutions to isolate the wood cellulose to mix with the groundwood for news print, or used alone to make wrapping paper or other superior grades of paper. Where the chemical pulp is made by the alkaline processes there are necessary complete evaporating plants for the recovery of the valuable chemicals.

Modern Equipment Replaces Primitive

In the exploration and cruising of timber areas, of which several thousand square miles may properly be operated by a single company, the most modern equipment is used. While the primitive canoe or river boat and dog team may still be necessary, airplanes and flying boats are commonly employed for this purpose as well as for fire detection. In the production of the pulpwood and its transportation to the mills there is very wide diversity. The methods employed and the equipment used depend on many factors such as the size of the timber, the topography of the country and the climatic conditions. In the northern and central parts of the continent the logging is done in the fall and early winter while the hauling of the timber is done on snow or ice roads with sleds. Although horses are still largely used steam and gas tractors are very commonly employed especially if the wood has to be transported several miles to the railroad or water course. The timber being generally small in size manual labor is still prevalent although for loading the sleds and railroad cars and decking the logs gasoline and steam jammers as well as loaders operated by horse power are used by the larger operators. In the same regions river transportation is largely the rule although logging railroads are being adopted by many companies partly to avoid the delay in receiving the wood and also to save the sinkage and losses that accompany river driving.

Towing Pulpwood in Booms

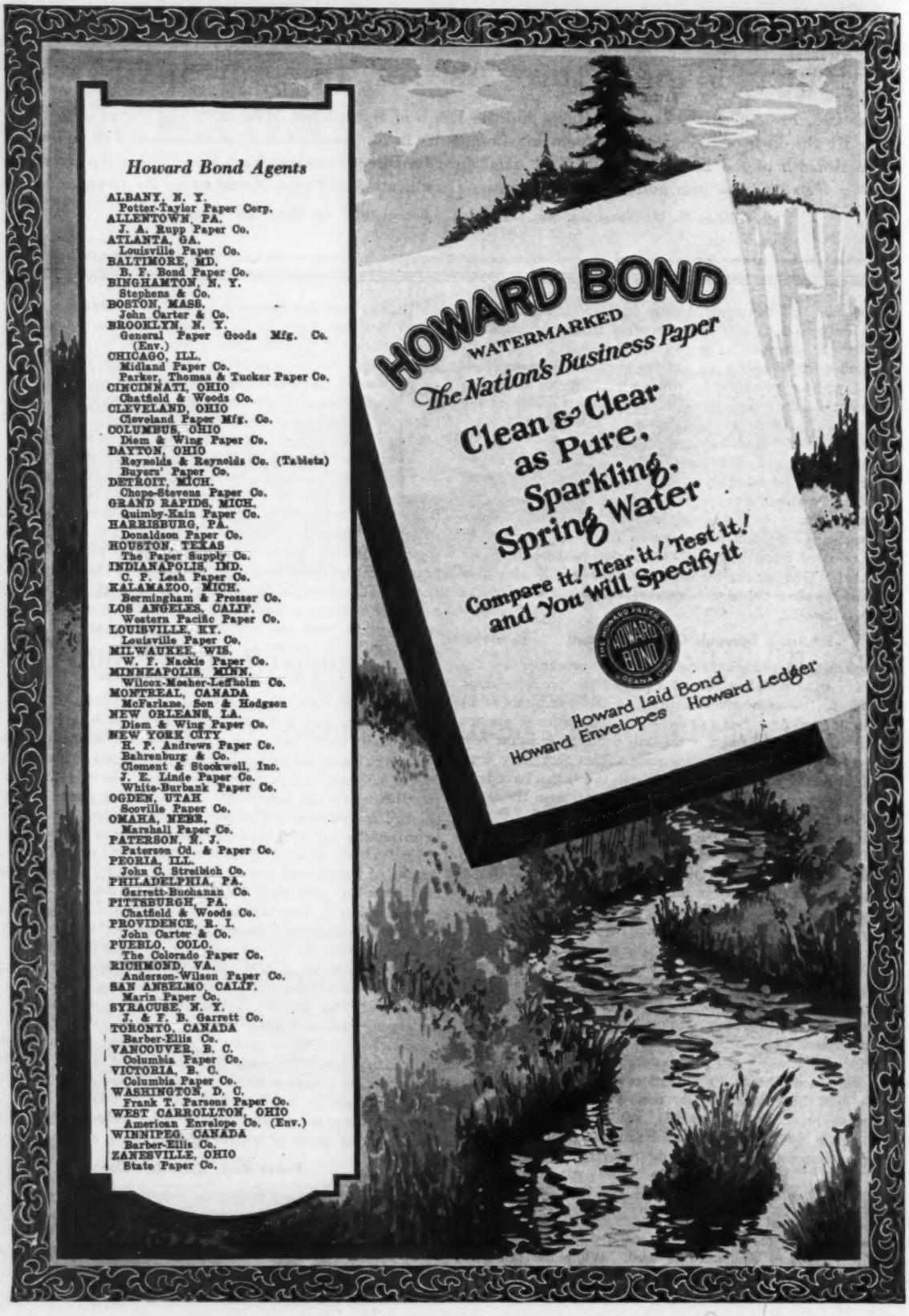
On the lakes many companies tow the pulpwood in booms with tugs or headworks. Where this is not feasible, especially along the Atlantic coast and on the St. Lawrence River, the wood is frequently loaded on barges and thereby brought to its destination. Many companies which have their timber limits a long distance from their pulp and paper mills operate rossing plants close to the point of embarkation and prepare the wood before shipment, thereby saving the freight or haulage on the weight of the bark. In addition the early removal of the bark has a tendency to prevent the attacks of insects and fungi, besides permitting the wood to dry out somewhat, still further reducing its weight.

On the Pacific coast the logging is done almost entirely during the summer and early autumn. In the absence of snow the transportation if not by rail or water is by trucks or tractors very largely operated by gasoline. The timber being large the logging operations are similar to those employed for the production of saw timber. Donkey engines, gasoline tractors, steam skidders and loaders are in general use.

In some places where water is available and the topography of the country favorable much use is made of chutes and flumes. Sometimes the flumes extend over ten to fifteen miles through territory not possible for logging roads. In other locations aerial tramways many miles long serve the same purpose where there is a deficiency of water or because of intervening canyons.

Power Boats Come Into Use

On tidewater logs are frequently towed by tugs and power boats for several hundred miles to bring them to the plant requiring them. Many of the self-contained plants also operate lumber mills in connection with their pulp and paper mills to utilize the timber which is more suitable for this purpose.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Parker, Thomas & Tucker Paper Co.
CINCINNATI, OHIO
Chatfield & Woods Co.
CLEVELAND, OHIO
Cleveland Paper Mfg. Co.
COLUMBUS, OHIO
Diem & Wing Paper Co.
DAYTON, OHIO
Reynolds & Reynolds Co. (Tablets)
Buyers' Paper Co.
DETROIT, MICH.
Chope-Stevens Paper Co.
GRAND RAPIDS, MICH.
Quimby-Kain Paper Co.
HARRISBURG, PA.
Donaldson Paper Co.
HOUSTON, TEXAS
The Paper Supply Co.
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The soda process, although the oldest in point of development, is now almost entirely confined to the treatment of the hardwoods. The pulp obtained from the character of the wood treated is consequently of short fiber and little strength. When bleached and mixed with the bleached chemical pulp of the long fibered spruce it is admirably suited for book paper of the higher grades. The soda pulp mills are comparatively few in number and are practically without exception adjuncts of book paper plants.

On the other hand the sulphate process is very widespread. In recent years its chief direction of expansion has been in the South on account of its applicability for the treatment of southern pine and other southern woods. The wood pulp made by the sulphate process goes very largely into wrapping paper on account of the superior strength and toughness of the product. This paper is also used in many of the newer paper products such as paper twine from which paper rugs and fiber furniture are made.

The chemical process that is probably in most general use is the sulphite, in spite of the fact that it is adapted to a comparatively limited number of species of wood, namely the conifers low in resin. The sulphite pulp from these woods, however, is light in color even when unbleached, while the sulphate made from the same woods is dark brown and commercially impossible to bleach to a white color. In consequence the unbleached sulphite has a wide use for white paper of reasonable brightness such as newsprint. When bleached, for which treatment it is well adapted, it is used for book paper, mixed with soda pulp or the pulp obtained from deinking used book paper. Alone it has a very wide use in making commercial writing papers known as sulphite bond. When mixed with rags in varying quantities the intervening grades between sulphite bond and the best grades of writing paper are made.

Besides for writing purposes the paper made from bleached sulphite is very largely used for paper specialties such as paper drinking cups and lace paper, in addition to being the basis for sanitary wrapping papers such as glassine and greaseproof. The bleached pulp is also used for the production of artificial silk.

The mills which use rags and waste paper as their chief raw materials are located naturally close to their sources of supply which are the large centers of population in the central and eastern parts of the continent. Rags and waste paper are generally sorted into a number of well established grades at the point of collection and distributed to the mills requiring them. There are two chief uses to which rags are put—the manufacture of the better grades of writing papers and the manufacture of roofing paper which is afterwards saturated or filled with asphalt and converted into prepared roofing or used to make a built up roofing.

How Waste Paper Is Used

Waste paper in turn is used in two principal ways according to the grade of material. The printed books and better grade of magazines, of which the paper has been made entirely of chemical pulp, goes to the book paper mills. Here the paper undergoes a deinking treatment whereby most of the printing ink is removed and the resultant pulp mixed with some fresh pulp again becomes book paper. The mixed waste paper made up of paper boxes, old newspapers and all unsorted paper goes to the paper board mills. Here it is defibered without attempting to remove the ink and is the chief raw material for the enormous tonnage of the cheaper grades of paper board of all kinds that is produced. The better board is converted into paper boxes, shipping cases, fiber containers and to some extent into wallboard.

In the actual manufacture of paper, as the list of equipment shows, there is extremely wide diversity. While there are only three or perhaps four classes of paper machines, in each of these classes there is wide variation according to the machinery manufacturer and the paper mill in which it is to be used. The great bulk of paper of lighter weights is made on fourdrinier machines while the paper board is made on the multi-cylinder machines, each cylinder supplying a layer, the thickness depending on the number of cylinders used. In making the lighter weights of paper the machine largely used is the harper fourdrinier while for tissue paper, the lightest in weight of all grades, either a fourdrinier paper machine or a single-cylinder machine is employed.

Machine Used on Special Boards

For many of the special boards, such as binders' board, trunk board, pressboard, etc., a machine similar to a pulp wet machine is employed so that the sheet is made of the desired thickness by allowing the sheet of wet paper to accumulate on the top press roll. It is then cut off and usually air dried and further processed for whatever purpose it may be designed.

In the mechanical operation of the paper machines there is also a very wide diversity. Many of the mills have been long established and have the equipment of the older days. In these the paper machines are driven either by water wheels or by constant speed steam engines. In order to get the necessary variation in speed different equipment is used to provide variable speed transmission. More modern plants have variable speed steam engines and steam turbines driving the paper machines while the most recent development in this regard has been the sectional electric motor drive with automatic control equipment. This type of power equipment is found in the news print mills of the most modern development and in which the paper machines operate at their highest speeds which are in excess of one thousand feet per minute of paper produced.

Located as many of the largest plants are and considering the extent of their mechanical equipment it is natural that they should have facilities of their own for their ordinary maintenance and repair requirements. As the processes are continuous the plants operate normally twenty-four hours per day for six days in the week and enforced shutdowns are in consequence expensive. It is necessary, therefore, that ample supplies be kept in stock as well as spare parts of essential machines.

The appended list of equipment does not indicate the relative importance of the items mentioned and in no single plant would all of them be found. In many instances as has been indicated several machines are used for the same purpose in different mills. It is to present a picture of the diversity of the demands of the paper industry,of those allied to it, and to some extent those remote from it, that the tabulation is given. It also gives an intimation of the variety of uses to which paper in some form is applied.

Classification of Paper Manufacture By Departments

I.—Administration and Offices

II.—Town

1. Housing
2. Schools
3. Church
4. Hospital
5. Water and sewage
6. Public safety
7. Merchandising
8. Hotel and boarding house
9. Laundry
10. Farm

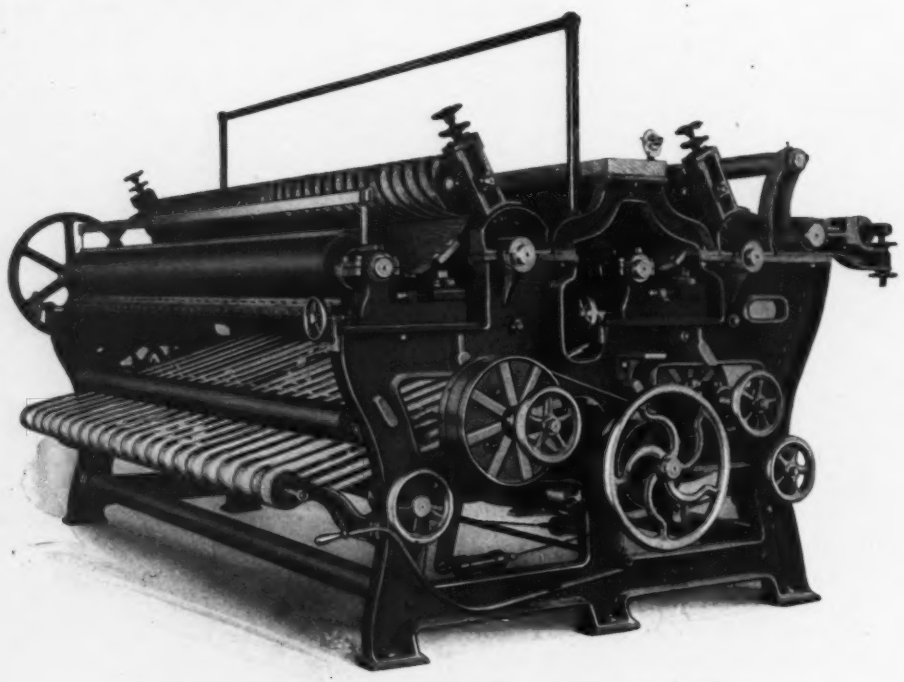
III.—Laboratory Equipment

1. Chemical analysis
2. Pulp testing
3. Paper testing
4. Coal testing
5. Oil testing
6. Cement testing
7. Belt testing
8. Meteorological records.
9. General

DILLON MACHINE CO.

Lawrence, Mass.

Paper Mill Machinery



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BUILT FOR STRENGTH—DURABILITY—ACCURACY

IV.—Engineering Department
1. Drafting
2. Surveying
3. Construction
4. Pattern shop
5. Foundry
6. Blacksmith shop
7. Machine shop
8. Carpenter shop
9. Electrical repair
10. General maintenance

V.—Power Plants
1. Hydro-electric plant
2. Steam power plant
3. Supplies

VI.—Pulpwood
1. Exploration
2. Production
3. Transportation
4. Preparation

VII.—Wood Pulp
1. Mechanical
2. Soda
3. Sulphate
4. Sulphite
5. Bleaching
6. General equipment and supplies

VIII.—Rags and Waste Paper
1. Rags
2. Waste paper

IX.—Paper Manufacture
1. Stock preparation
2. Papermaking
3. Paper finishing

X.—Paper Conversion
1. Coating
2. Waxing
3. Oiling
4. Saturating
5. Creping
6. Pasting
7. Ruling
8. Printing
9. Bag making
10. Box making
11. Tube making
12. Envelope making
13. Cup making
14. Cap making
15. Tablet making
16. General

I.—Administration and Offices

EQUIPMENT

Desks; Chairs; Filing cabinets; Safes; Safe cabinets
Dictaphones
Typewriters; Calculating machines; Check writers
Photostat machines
Mimeographs; Multigraphs

For the plants:
Sprinkler systems; Fire exintguishers; Fire hose, nozzles, etc.
Telephone systems; Electric clocks
Lightning rod equipment
Fencing; Safety signs
Time recorders; Watchman's clocks
Lockers

SUPPLIES

Lithographed and printed letterheads and envelopes
Typewriting paper; Carbon paper; Typewriter supplies
Pens; Inks; Pencils
General office supplies

For the plants:
Waterproof clothing
Rubber boots
Picks, shovels, axes, brooms, etc.

II.—Town

1. HOUSING
Ready cut housebuilding material; Cement; Brick; Hollow tile
Lath; Plaster; Wallboard; Roofing
Heating furnaces and stoves; Cooking ranges
Bathroom fixtures
House furnishings and furniture
2. SCHOOL
Equipment and furniture
3. CHURCH
Furnishings and furniture
4. HOSPITAL
Equipment for a small hospital
Hospital beds; Operating tables
Hospital and dispensary supplies
5. WATER AND SEWAGE
Standpipe; Pumping equipment; Water pipe; Hydrants
Water meters; Chlorination and filtration equipment
Sewer pipe; Catchbasins; Garbage incinerators
6. PUBLIC SAFETY
Police and fire protection equipment for village
Jail fixtures; Police uniforms
Fire hose and reels; Fire extinguishers
7. MERCHANDISING
Equipment, supplies and stocks for a general department store
8. HOTEL AND BOARDING HOUSE
Complete equipment for sleeping rooms, bathrooms, dining room and kitchen
Hotel supplies
9. LAUNDRY
Complete equipment and supplies for a steam laundry
10. FARM
Land clearing equipment
Farm machinery and tools
Barn and stable equipment
Veterinary supplies

III.—Laboratory

Equipment

1. CHEMICAL ANALYSIS
Laboratory desks; Regent cabinets; Hoods
Hot plates; Muffle furnaces
Balances and scales; Laboratory suction pumps
Water stills; Extraction apparatus
Chemical glassware; Equipment for volumetric analysis
Standard screens; Gage testers; Specific gravity instruments
Gas analysis equipment; Plastimeters; Stopwatches
2. PULP TESTING
Sampling tools and containers
Drying ovens
Laboratory ball mills; Laboratory beaters
Centrifuges; Freeness and slowness testers
Sheetmaking machines
Color comparison instruments; Stereopticons
3. PAPER TESTING
Basis weight scales; Micrometers; Microscopes
Bursting strength testers; Folding, Tearing and Tensile strength testers
Size testers; Glarimeters; Tint photometers; Fadometers

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NEW YORK

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5. Oil Testing
   Viscosimeters; Fire and flash testers
6. Cement Testing
   Equipment
7. Belt Testing
   Equipment
8. Meteorological Equipment
   Maximum and minimum thermometers; Hygrometers; Anemometers
   Barometers; Precipitation measurement instruments
9. Supplies
   C. P. chemicals; Filter paper; Glassware
   General laboratory supplies

IV.—Engineering Department

1. Surveying
   Transits; Levels; Rods; Chains; Steel tapes
2. Drafting
   Drafting tables; Drafting instruments
   Drawing and tracing paper; Tracing linen
   Blueprinting machines; Blueprint paper
   Cameras and printing equipment
3. Construction
   General equipment and supplies for construction of dams, houses, offices, plant buildings and installation of machinery
4. Pattern Shop
   Pattern-making tools and supplies
5. Foundry
   Equipment, tools and supplies
6. Blacksmith Shop
   Forges; Anvils; Blacksmith's tools
   Power punch and shears
   Riveting hammers
   Horseshoeing tools
7. Machine Shop

Equipment

   Portable hand and power operated and stationary power tools of all kinds
   Travelling cranes; Jib cranes; Chain blocks
   Drills; Lathes; Shapers in a few sizes; Electric drills
   Boring mills; Milling machines; Key seaters; Gear cutters
   Roll grinders; Roll calipers
   Knife grinders; Saw sharpening machines
   Metal saws; Emery wheels
   Portable electric drills; Air hammers
   Portable hydraulic forcing presses
   Screw packs; Hydraulic jacks
   Pipe cutting and Threading machines and hand tools
   Valve reseating tools
   Bolt cutters
   Oxyacetylene and Electric cutting and welding equipment; Metal saws
   Gas generators; Carbide
   Paint spraying machines
   Cement guns
   Tachometers; Thickness gages; Calipers

8. Carpenter Shop
   General carpenter shop equipment
   Circular and band saws; Planers; Molders
   Carpenter's hand tools
   Wood plug machines; Wood core making machines

9. Electrical Shop
   Lineman's climbers and tools; Wire pullers
   Conduit; Insulators
   Insulated wire
   Receptacles; Brushes; Fuses
   Switches; Lamps; Lamp guards; Flashlights

10. Maintenance and Supplies

Power Transmission

   Shafting; Hangers and stands; Bearings; Bushings; Oil and grease cups
   Pulleys of iron, steel and paper
   Belt tighteners; Speed reducers
   Gears and pinions; Miter and mortise gears
   Rope sheaves; Sprockets
   Shaft couplings; Flexible couplings; Friction couplings
   Clutch couplings; Magnetic clutch couplings
   Transmission rope
   Transmission belting
   Leather; Rubber; Balata; Camels hair; Canvas
   Conveyor belting
   Rubber; Canvas; Steel
   Conveyor chains and attachments
   Detachable and riveted
   Wire cable and attachments
   Belt hooks and lacing; Belt dressing; Rope dressing

Supplies

   Spare machinery parts
   Pipe couplings; Unions; Flanges; Elbows; Bends; Angles; Crosses
   Packing
   Rubber; Asbestos; Flax; Metallic
   Gaskets
   Fire doors; Wire glass; Steel sash
   Ventilators
   Expanded metal and Woven wire for guards
   Paint for wood and metal
   Tool steel
   Steel, Iron, Bronze and Monel metal in rods, bars and sheets
   Cutting compound
   Kerosene; Gasoline

V.—Power Plants

1. Hydroelectric Plant

Machinery and equipment

   Penstocks; Gates; Racks
   Waterwheels and turbines
   Waterwheel governors
   Electric generators and exciters; Motors
   Switchboards and control equipment
   Transformers; Lightning arrestors
   Indicating, Integrating and Recording electrical instruments
   Oil pressure recording instruments
   Electric cranes and Hoists
   Water level recorders
   Oil tanks and filters
   Wood and steel poles and fittings; Power transmission wire; Messenger wire
   High tension insulators

2. Steam Power Plant

Machinery and equipment

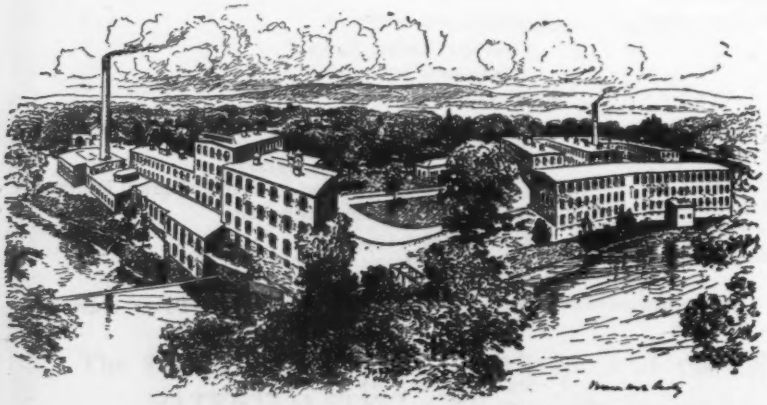
   Steel, brick and concrete chimneys
   Boilers of all designs; Superheaters; Economizers
   Electric boilers

Over 61 Years of Leadership in the Ledger Paper Field

BYRON WESTON COMPANY MILLS, 1863

PAST history is of value only in the light of present performance. The unrivaled reputation of Byron Weston Co.'s papers was established over half a century ago, and has been uniformly maintained through all the ups and downs of paper-making history.

Any paper mill can make good paper some times; but the crucial test is to make good paper at all times. As a matter of fact, any series of tests will demonstrate that Byron Weston Co.'s papers are even better today than at any past period since Mr. Byron Weston began operations in 1863.



BYRON WESTON COMPANY MILLS, 1924

BYRON WESTON CO.,

DALTON, MASS.

Steam accumulators
Furnaces and Automatic stokers; Hand stokers
Special furnace arches
Fans for forced and induced draft
Cinder eliminators
Air preheaters
Soot-blowing equipment; Tube cleaners
Draft control equipment
Feed water control equipment
Automatic relief valves; Whistles
Reducing valves; Blowoff valves
Coal bunkers; Coal elevators and conveyors
Coal storage equipment
Coal scales; Coal crushers
Coal pulverizing and burning equipment
Ash conveyors; Gratings; Ladders
Oil burning equipment
Fuel oil tanks
Tanks for lubricating oil
Water softeners; Feedwater heaters; Hot wells
Water meters; Steam flowmeters
Indicating and recording thermometers; Draft gages and Steam gages
Boiler meters; Recording gas analyzers
Boiler-feed pumps; Steam traps and separators
Steam fire pumps
Boiler and steam pipe insulation
Steam turbines; Steam engines; Oil engines; Gas engines; Electric generators and motors
Air washers
Engine stop and signals; Engine governors
Condensers; Air compressors
Switchboards
Circuit breakers and Control switches

3. SUPPLIES
Fire brick and Fire clay; Special furnace shapes
Boiler tubes; Superheater and Economizer tubes
Grate bars; Conveyor chain and buckets
Boiler compound
Fire hose; Steam, water and air hose
Steam and Water packing and pump valves
Gage glasses; Gage glass protectors
Steam pipe, fittings and valves
Expansion joints
Steam traps and separators
Coal and Fuel oil
Transformer oil
Lubricating oil; Steam cylinder oil
Cotton waste; Wiping rags
Waste washing machines
Insulating tape

VI.—Pulpwood

1. EXPLORATION
Canoes, Boats and Camping supplies
Airplanes; Flying boats
Aerial photography equipment
Radio equipment

2. PRODUCTION
Camp equipment and supplies; Cots and bedding; Heaters; Cooking ranges; Canned goods; Dried fruit; Condensed milk, etc.
Electric lighting equipment
Horses and Logging harness
Horse trucks and logging sleds
Cross cut saws; Wedges; Cant hooks; Peavies; Pike poles
Pickaroons; Chain; Axes; Bark spuds; Tool handles
Donkey engines; Blocks and Cable
Steam skidders and equipment

3. TRANSPORTATION
Side rod and Geared locomotives; Logging cars and Railroad equipment
Safety car stake equipment
Power trucks, Steam and Gas tractors; Snow plows; Water tanks
Road machinery; Culverts
Gas and Steam power boats; Alligators; Tugs, Barges; Booms; Boom chains
Aerial tramways
Horse and Power loaders; Locomotive cranes; Wood grapples
Cableways

4. PREPARATION
Saw carriages; Band saws; Slasher saws; Jump saws
Steam and Power kickers and niggers; Jack ladders
Knife barkers and Barking attachments
Slab barkers
Drum barkers; Wood washers
Log barkers
Pulpwood storage conveyors; Pulpwood stackers
Wood splitters operated by power and steam
Slab chippers
Chippers; Rechippers; Crushers; Hogs
Chip driers; Chip screens
Bark presses; Conveyor scales

Supplies
Saws; Barker and Chipper knives
Cant hooks; Axes; Hookaroons

VII.—Wood Pile (General equipment in 6)

1. MECHANICAL PULP
Pocket, Magazine and Caterpillar grinders
Dressing lathes and burrs
Grinder speed governors
Pressure regulating valves
Pressure pumps; Accumulators
Bull screens; Sliver screens
Hydraulic presses
Wire mat weaving machines

Supplies
Grindstones; Flanges; Shafts, Couplings
Flange removers; Flange bushings; Grinder piston packing

2. SODA PULP
Soda digesters; Control instruments
External heating equipment
Digester insulation; Pipe insulation
Blow tanks; Washing pans; Special washing equipment
Black liquor filters
Multiple effect vacuum evaporators
Rotary furnaces
Dissolving tanks; Filter presses
Charcoal recovery apparatus
Causticizing tanks and apparatus
Continuous filters for washing lime sludge and brown pulp
Lime recovery apparatus

Supplies
Soda ash; Lime; Fire brick

3. SULPHATE
Sulphate digesters and control instruments
External heating equipment
Digester insulation; Pipe insulation
Diffusers; Washing tanks; Washing apparatus

The House of Dexter

MANIFOLD LINEN

DEXSTAR MANIFOLD PAPER is not merely a second sheet. It is a high grade writing paper in tissue weight; designed for making multi carbon copies of important letters and documents.

This paper has the strength and finish which can only be secured from a rag base. It is especially recommended for legal work, mailing lists and select wrapping requirements.

TISSUE PAPERS

DEXSTAR TISSUE PAPERS are notable for their beautiful and permanent colors, which are used for various decorative purposes.

Special white numbers in this line are made for wrapping silver ware (anti-tarnish). Other items are used for a wide range of industrial requirements.

Write for Sample Book and Price Lists.

C. H. Dexter & Sons, Inc.

Windsor Locks

Conn.

Multiple effect vacuum evaporators
Disk evaporators
Rotary furnaces
Smelting furnaces; Air compressors
Electrical precipitation equipment
Dissolving tanks
Causticizing tanks
Continuous filters for washing sludge and pulp
Continuous causticizing and lime recovery equipment
Rosin and turpentine recovery equipment

Supplies

Smelter furnace linings; Soapstone in blocks
Salt cake; Lime

4. SULPHITE

Sulphur burners and control instruments; Recording pyrometers
Bruner gas coolers; Refrigerating machines
Gas washers

Milk of lime

Lime slackers
Milk of lime absorption systems
Gas exhausters

Limestone

Absorption towers and control equipment
Lead and Bronze gas fans
Limestone quarrying equipment; Lime burning equipment
Acid storage tanks; Liquid level recorders
Recovery tanks and towers; Gas masks
Chemical stoneware; Tower packing
Cymene recovery equipment
Sulphite digesters and control instruments
Digester linings; Indirect heating equipment
Digester insulation; Pipe insulation
Blowoff valves; Relief valves; Steam separators
Digester relief coolers; Blowoff pipe
Acid pumps and valves
Bronze, monel metal and lead valves
Lead and bronze check valves
Blowpits; Drainer tile and matting
Waste sulphite liquor concentrating and drying equipment
Lead burning equipment

Supplies

Digester lining brick; Quartz; Litharge; Glycerine; Silicate of soda
Sheet lead; Lead bronze and copper pipe
Bronze and hard lead strainers
Bronze and monel metal shafting for acid pumps
Sulphur; Lime; Limestone

5. BLEACHING

Electrolytic chlorine cell equipment
Caustic soda recovery equipment
Bleach powder dissolving equipment
Liquid chlorine absorption systems
Settling tanks
Pulp bleachers; Tanks and Agitators
Bleached pulp washing equipment

Supplies

Pulp; Salt; Liquid Chlorine; Lime; Bleaching powder

6. GENERAL WOOD PULP EQUIPMENT

Knotters; Diaphragm and centrifugal screens
Screenings refiners; Kollergangs
Rifflers
Thickeners; Deckers; Wet machines; Automatic skinners
Savealls; Sedimentation tanks
Pulp drying machines
Tanks; Agitators
Fans; Ventilating equipment
Centrifugal and Plunger stock pumps; Stock meters
Stock consistency regulators
Baling presses

Supplies

Screen plates; Screen diaphragms
Cylinder molds and Backing wire; Cylinder packing
Bronze and nickel alloy facing wire
Skinning sticks

VIII.—Rags and Waste Paper

1. RAGS PREPARATION

Sorting tables; Conveyors; Ventilating equipment
Rag cutters; Dusters
Cylinder and Globe rotary boilers
Bleaching and washing engines
Drainers; Drainer tile

Supplies

Rags; Old rope; Bagging; Cotton linters; Manila; Hemp, etc.
Lime; Soda and ash; Bleach; Antichlor

2. OLD PAPER CONVERSION

Sorting tables; Conveyors; Ventilating equipment
Paper shredders; Dusters
Vomiting boilers; Kiers; Cylinder and Globe rotary boilers
Special deinking and defibering equipment
Paper washing equipment
Continuous beaters and Beating attachments
Paper pulpers
Cooking and pulping engines
Magnetic separators

Supplies

Paper stock of all kinds
Soda ash; Kerosene; Bentonite; Bleach

IX.—Paper Manufacture

1. STOCK PREPARATION

Equipment

Hand and electric trucks; Portable elevators; Monorail systems
Conveying and elevating equipment
Pulp shredders; Paper pulpers
Hollander and special beating engines; Lava stone beater rolls and bedplates; Beater attachments; Washing cylinders
Mixing tanks; Mixing and proportioning apparatus
Kollergangs; Refiners; Jordans; Tanks; Agitators; Agitator drives
Stock consistency regulators; Plunger and Centrifugal stock pumps
Water screens and filtering systems; Water pumps
Clay mixing apparatus; Stock chests; Gate valves
Size cookers; Emulsifying apparatus
Color testing and matching equipment; Daylight lamps
Savealls and sedimentation systems

Supplies

Wood pulp of all kinds; Rag pulp; Rope pulp; Cotton linters
Old paper; Shavings, etc.
Clay; Talc; Crown filler; Pearl hardening; Barytes; Blanc fixe, Satin white, etc.
Rosin; Soda ash; Size; Silicate of soda; Glue; Starch

H. W. ELLERSON, President
S. C. KNODE, Vice-President
B. W. COALE, Treasurer
W. L. SAUNDERS, Secretary

THE ALBEMARLE PAPER MANUFACTURING COMPANY

Hollywood Mills—Brown's Island Mills
BLOTTING - KRAFT - SPECIALTIES

RICHMOND, VIRGINIA

ESTABLISHED 1887

Blotting Papers of Every Description

PLAIN—COATED—EMBOSSED

"DIXIE" KRAFT

Sulphate of alumina
Aniline dyes and pigments
Beater and jordan bars of steel, manganese steel and bronze
Special beater and jordan fillings; Bedplates of steel, bronze and stone
Beater paddles
Spiral riveted, iron, steel and wood pipe
Wood pipe fittings; Corporation cocks

2. PAPERMAKING

Equipment

Fourdrinier paper machines; Straight; Harper; Yankee
Cylinder paper machines; Single; Multi-cylinder
Single cylinder Yankee machines; Wet press machines
Combination and special paper machines
Non-condensing steam engines
Variable speed transmission equipment
Variable speed non-condensing steam engines
Non-condensing and Bleeder steam turbines
Direct current electrical generators
Sectional motor drive systems
Direct current motor drive
Special drives:
Marshall; Ferguson; Crandell
English system rope drive
American system rope drive
Paper machine attachments:
Edwards
Tompkins-Hawley-Fuller
Sheahan paper carriers
Pope air system
Minton's vacuum driers
High stock inlet
Wire elevating apparatus
Deckle frame supports
Wire guides; Felt guides; Drier felt guides; Recording tachometers; Special guard boards and sluices
Broke conveyors
Felt washers and conditioners
Jacket stretchers
Oscillating suction boxes
Dandy rolls; Special paper-marking equipment
Suction couch rolls; Suction presses
Special shower pipes; Calender doctors
Steam circulation systems; Drier control systems
Vapor absorption systems; Waste heat economizers
Dryloft equipment
Airdrying equipment
Hoods; Fans; Airheating equipment
Paper machine screens, diaphragm, oscillating and revolving
Chain blocks; Air and electric hoists; Traveling cranes
Reels; Winders and slitters
Collapsible windershafts; Electric irons
Oil and grease lubrication systems; Oil filters
Condensation pumps; Positive pressure blowers
Suction pumps; Fan pumps; Savealls; Sedimentation systems

Supplies

Fourdrinier wires; Cylinder facing wires
Woolen felts; Jackets; Drier felts; Deckle straps
Rubber covered rolls; Wood and stone press rolls
Calender rolls; Felt rolls; Table rolls
Suction box covers; Doctor blades
Wood cogs
Air, water and steam hose
Screen plates; Slitter knives
Belting and packing; Apron cloth; Rubber tissue
Oil; Grease, Waste, Sulphuric acid: Felt cleaning compounds
Wire brushes, Brooms, etc.

3. PAPER FINISHING

Rotary paper cutters; Layboys; Counters; Electric neutralizers
Sheet trimmers
Rewinders
Paper tubes; Cores
Roll wrapping machines
Paper folding machines
Supercalenders; Embossing calenders
Platers; Friction calenders
Travelling cranes
Scales
Baling presses
Stencil cutting machines

Supplies

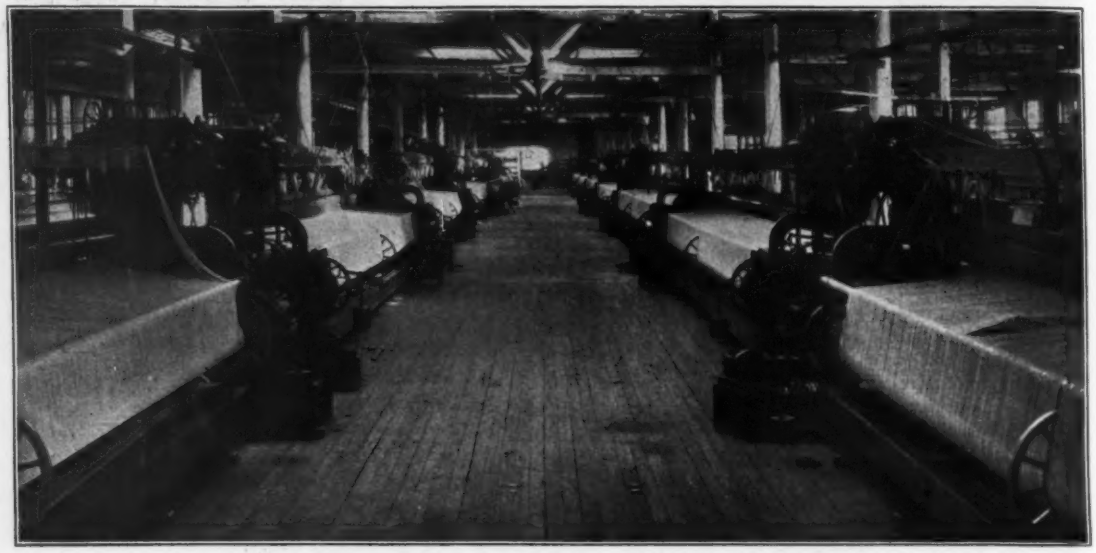
Dextrine; Silicate of soda
Adhesives
Mill wrappers; Jute twine and tube rope
Sealing wrappers; Labels
Fiber shipping cases
Wood shipping cases and frames

X. PAPER CONVERSION

1. Paper coating machinery
2. Paper waxing machines
3. Oiling machines
4. Saturating machinery
5. Creping machines
6. Pasting machines
7. Ruling machines
8. Printing presses
9. Bag making machinery
10. Box making machinery
    Scorers; Corrugators; Pasters; Glue dissolvers
    Gluing machines; Box covering machines
11. Paper tube and core making machinery
12. Envelope making machines
13. Paper cup making machines
14. Bottle cap making machinery
15. Tablet making machinery
16. General equipment
    Wallboard driers
    Air conditioning equipment
    Airdrying equipment
    Coating mixers
    Gumming machines
    Twisting machines
    Paper textile machines

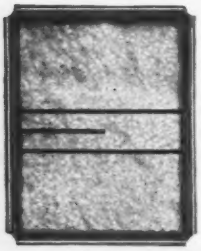
RECEIVER FOR TRI-STATE CO.

Frederick C. Ritger, a Newark attorney, has been appointed temporary receiver for the Tri-State Pulp and Paper Company of 790 Broad street, Newark, N. J. The company's factory is at Highbridge, N. J. The appointment was made by Vice-Chancellor Backes who has directed the corporation to explain why the receivership should not be continued. Application for the receiver was made by Frank G. DuBois, secretary-treasurer of the concern who is also a creditor with a claim for $21,748. A paper filed by his attorney, Frank W. Long, set the assets at $118,000, book value, and liabilities at $131,598.43. The company was incorporated under the laws of Delaware on September 22, 1920.



Main aisle in one of the Weave Rooms

Where Scientific Precision has Replaced Guesswork



You will recognize Hamilton felts by two blue lines running the full width of the felt with one shorter blue line between them.

IN such a process as the production of felts for paper mills absolute control of the processes, accurate to the last detail is essential to success.

Hamilton felts are made under such control. We know the precise contents of every solution; the exact degree of heat in every dryer; the nature of the fibre we are handling and the proportion of the mixtures.

This modern precision has come to the aid of a practical experience running back 66 years. It has made possible products like the Hamilton A plate felt—a boon to hundreds of paper makers.

The demand of paper makers for this felt has astonished us. Every month it grows noticeably greater—and once a mill has used A Plate felts it keeps ordering more! Hamilton felts are made for every paper mill use.

Let our service men help with your felt troubles whether you are now using Hamiltons or not.

SHULER & BENNINGHOFEN

Miami Woolen Mills

Founded 1858 Hamilton, Ohio

Hamilton Felts

MANUFACTURERS IN CONVENTION

American Paper and Pulp Association Holds Forty-Seventh Annual Meeting at Waldorf-Astoria Hotel, New York.

Henry W. Stokes of the York Haven Paper Co. Re-elected to Head Association for Another Year—Executive Committee Given Power to Act in Regard to Unfair Foreign Paper Competition—W. A. Durgin Speaks on Simplification Problem—Meeting Goes on Record for McNary-Clarke Bill and Also Urges Congress to Speed Up on Taxation Problems—Meetings Affiliated Associations.

Prompt to the second, President Henry W. Stokes called the general session of the American Paper and Pulp Association to order at 10:30 o'clock, Thursday morning, in the Astor Gallery. With a brief word of welcome he immediately called upon Norman W. Wilson, chairman of the committee which has been studying reorganization plans for the association, to make his report on the deliberations of the committee. Without debate, the report of the commitee was unanimously accepted and the program as outlined adopted.

Finance Report

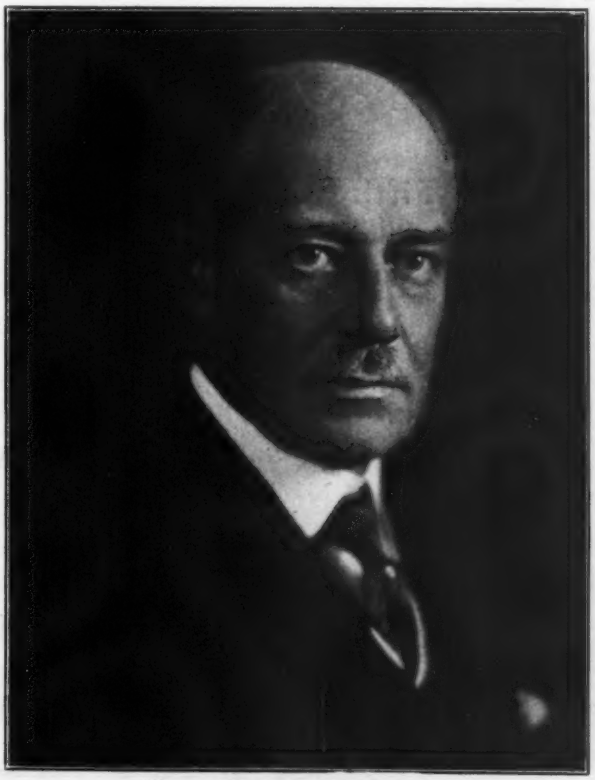
Former President Raybold made the report of the Special Financing Committee which has had charge of the task of lifting the Association out of financial distress. The report showed that 114 different companies responded to the appeal sent out and that the average contribution was $220. The report showed also that the deficit has been wiped out and that the association, since the first of this month, had been on a sound financial basis.

Importations

The meeting received a copy of the resolution adopted on Tuesday by the Salesmen's Association on the Paper Import situation and a request that the association take some steps for the protection of the American Paper market against the bringing of improperly classified paper into the country.

President Stokes suggested that the matter was one which might well be referred to the incoming executive committee.

E. W. Kiefer of Port Huron, Mich., moved that the matter be referred to the executive committee with power to act and that it be recommended that the committee appoint a committee or committees to handle the subject. The motion was carried.



HENRY W. STOKES, PRESIDENT

W. A. Durgin of the Department of Commerce was then called upon to address the meeting on the subject of "The Simplification Problem."

Simplification Problem

Mr. Durgin said the work had been going forward most encouragingly and that the fact was being driven home that the function of the distributor is to serve the consumer at a profit rather than to merely give the consumer what he thinks he wants. There was no need to worry abount the distributor and consumer fields but the simplification program would not go nationally unless it had the endorsement and support of the producers. He urged that the pledge to the program be signed. "It simply binds you to use your best efforts to conform to certain sizes," he said. 'We have no police power," however, "and cannot send you to Leavenworth if you fail to conform to them. The signing of the pledge simply places you on record as in favor of simplification in your business."

Mr. Durgin went on to say that the government was not in this on its own initiative but that there was a real demand for simplification and the government was only functioning to get all the factions together. "If only one branch got into it," said Mr. Durgin, "I suppose someone would raise a hue and cry about being in restraint of trade. But the time has come when we must go through with this or cast it into the discard for all time. It will either become a great benefit to the industry soon or we would like to withdraw from our efforts very soon."

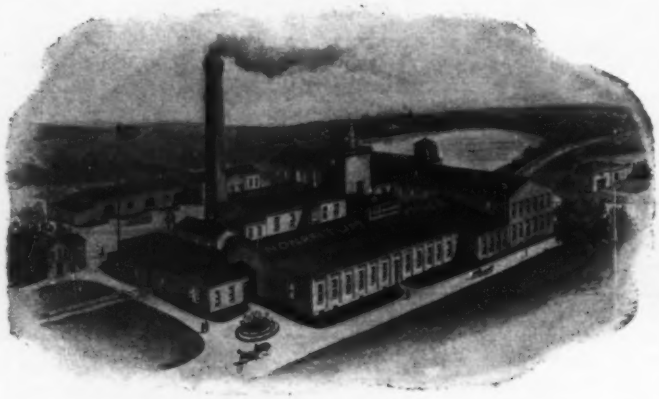
Following this address a resolution on the subject was adopted. It read:

"It is the sense of this meeting to get behind the paper simplification program to the limit and make it effective in the shortest possible length of time."

ALFRED A. CURTIS, President

CHAS. MAGARGE LEVIS, Vice-Pres. and Sales Mgr.

ROBERT C. LEVIS, Secretary



MILLS OF CURTIS & BROTHER, INC., NEWARK, DEL.

CURTIS & BROTHER, INC.

PAPER MAKERS

Sales Office and Warehouse

14-16 South Fifth Street, Philadelphia, Pa.

OFFSET—CURBRO OFFSET.

SUPER CALENDERED BOOK—Nonantum Plate and Curbro Super-Calendered.

MACHINE FINISH—Curbro Machine Finish.

HIGH GRADE ANTIQUE—Nonantum Double Antique Wove, Nonantum Velvet Finish, Newark Wove India, Dover Laid, Nonantum Antique Wove.

COVER PAPERS—Paradox, Duane, Universal, and Executive.

WRITING PAPERS—Nonantum Kid Finish Wedding, and Curtis Bond.

COATED BOOK—Agents for Martin Cantine's Coated Papers.

The New Officers

The following officers were elected:

President: Henry W. Stokes, York Haven Paper Co., Philadelphia. (Reelected).

Vice President: Norman W. Wilson, Hammermill Paper Co., Erie, Pa. (Reelected.)

Western Vice President: Alex Gilman of Allied Paper Mills, Kalamazoo, Mich.

Executive Committee: Phillip Dalton of Byron-Weston Paper Co. of Dalton, Mass.; Herman Elsas, Continental Bag and Paper Mills, New York; Frank J. Senzenbrenner, Kimberly Clark Co., Neenah, Wis.; W. F. Brunner, Patterson Parchment Co., Passaic, N. J.; George W. Seaman, Seaman Paper Co., Chicago.

Resolutions Adopted

Two resolutions were adopted. One placed the Association on record as in favor in the government forestry program and endorsing the McNary-Clarke bill now in Congress.

The other resolution urged the settlement as speedily as possible by Congress of our tax problems.

PRESIDENT'S STATEMENT

The following statement was presented by Henry W. Stokes, president of the association:

1923 A Basic Year

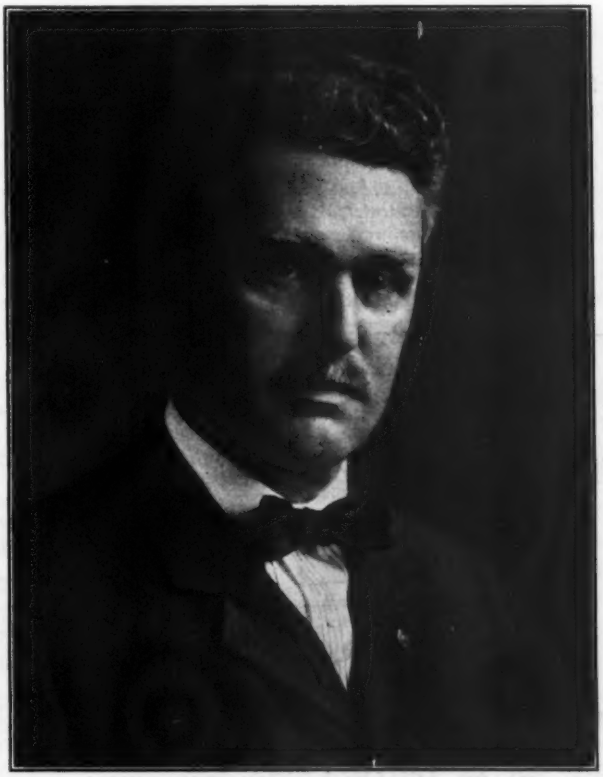
For a long time to come, in the opninon of many men conversant with conditions in the paper industry and with general business conditions, the calendar year of 1923 will be regarded as a basic year, with which to compare conditions in the years to come.

New Comparisons

The establishment of a new basis of comparisons may have been responsible for some of the disconcerting conditions that have been experienced during the past year, but instead of discontent with the state of business, the paper industry should look forward with optimism based on the fact that at last the business of the nation and of this industry in particular has reached a stable basis.

It must be recognized that while prices have not been as satisfactory as the mills may have posed, the production for 1923 was only a few thousand tons under the previous high production record of the industry. No business can be considered unprosperous in a year when its production totals have been practically of record breaking volume.

Years of big profits and heavy demand may be pleasant to contemplate, but any such overprosperity must be followed by the swing of the pendulum of business to a period of depression, and the period of normal activity is that in which, and in which only, the business man can dispassionately consider and study his business status.



DR. HUGH P. BAKER, SECRETARY-TREASURER

Uncertain Elements

It is true that there are some uncertain elements existing at this time. First, the economists say the nation is facing a period of slowly decreasing prices, and this has had the reaction in the paper industry of a large volume of short-order business, and not a volume of large orders and heavy stocking of warehouses. This tendency has persisted in the face of increasing prices for raw materials for the finer papers, and an unchanged labor situation. It is questioned by many experts whether the view of the economists applies truly to the paper industry with its slowly but surely diminishing reserve of raw materials. Col. Greeley, chief of the United States Forest Service, in a recent magazine article, prophesies the day when paper consumption will be diminished with the higher cost of raw material, due in turn to the diminishing acreage of usable forest. The great fallacy today is to consider present prices in comparison to those that obtained in 1914, as if that were a basic year. 1914 prices and the conditions under which they existed are past and gone. The new basic year for prices and the present conditions, which govern prices and which will long continue, is 1923. Our gold reserve, European conditions, labor supply, our industrial expansion and domestic consumption all make 1923 a normal year for price comparison for some time to come and make any comparison with 1914 as unsound as it is dangerously misleading. Business must forget 1914 and think in terms of 1923.

Political Situation

The second cause of uncertainty is the political situation, not so much the fact that this is a presidential year, but the playing at politics at Washington on tax and other matters affecting business, and the tendency of the legislature to sacrifice business and prosperity to partisan advantage.

Importations

The third difficulty is the importation of foreign papers, not in sufficient volume to disturb the market, but under such condition of unfair competition as psychologically to upset the market in which relatively small importations are pyramided by brokers into apparently large shipments.

Good Outlook

In the face of such factors, it is truly remarkable that January and February paper production held up to the high record figures of a year ago, and estimates of car requirements for the first six months of the year by the big paper companies, made to the railroads, falling off from the previous high record of the first half of 1923. It is to be noted that in 1923 the first six months of business was above that for any similar period in the history of the industry. Only an unexpected change in conditions in the latter half of the year prevented 1923 from being a year of record breaking production in all grades.

The Veiled Profit
or The Mystery of the Missing Filters

Jones was employed by one of the large appraisal companies, who had just contracted to make an appraisal of the properties of the Whiting-Plover Paper Company, at Stevens Point, Wisconsin, the city whose slogan is "Wonderful Water." He was assigned particularly to investigate the value of that company's water supply, which, apparently they rated very high.

He knew, of course, in a general way, of the importance of pure water in the manufacture of paper, especially fine papers, and in order to properly prepare himself for his new assignment, he proceeded to consult books by various authorities on paper-making. He found them all unanimous in declaring a supply of pure water to be of fundamental importance in the manufacture of bonds and other high grade papers. Ordinary water, he read, often contains impurities which affect the color, by reacting with the dyestuffs. Sometimes the sizing is affected, sometimes the permanency, sometimes the cleanliness, and in general, the authorities agreed that without proper water, it is very difficult to hold these factors under proper control. Jones also read long chapters on filters, filtration plants, softening plants, chemicals used in purifying water, as having heard Mr Whiting, President of the Whiting-Plover Paper Company, state that his company's water supply, was in his estimation, worth in excess of a million dollars, he wished to be properly prepared to appraise the value of the extensive and expensive filtration plant he expected to find.

When he arrived at the mill where *Artesian* and *International Bonds* are made, after the usual preliminary introductions, he asked for copies of the analyses of the water as used. These analyses had been made by some of the best known consulting chemists in the United States. All reports were uniformly favorable. One stated that in the opinion of the chemist the water used by the Whiting-Plover Paper Company was equivalent to distilled water, in appearance, color, odor, sediment and turbidity, being zero in the last four items. Another concluded with the statement that the use of this water should reduce to a minimum the quantities of dyes, alum and size required.

Jones then started on his tour of examination. He walked through the basement, but no filters could he find. He went through the other parts of the mill, but still no filters, although enormous quantities of water were being used in various departments. He stopped an intelligent-looking old workman, and asked him where the filters were located. The workman replied that he didn't know, that he didn't think there were any. "What a dumb-bell," thought Jones, "I suppose this man has worked here for years, and yet he doesn't know where the filtering plant is located."

So he sought out the Superintendent, and Jones was startled to be informed that there were no filters or filtration plant, that the water was used as it came from the spring wells. "The immense bed of sand and gravel from which this water is drawn, acts as a natural filter," said the Superintendent, "and we have another advantage in the fact that our water is always of the same temperature, winter and summer, and this is no small matter, either, as any practical papermaker will appreciate, and furthermore, our water is always the same in quality. I mean we don't have to worry about excessive or deficient dosages of water-purifying chemicals, or lack of attention to cleaning the filters on the part of the attendants. And the seasons have no effect upon the color or quality of our water. It may interest you to know that our chemist uses our water for many purposes where distilled water is ordinarily required."

"I can think of still other advantages of a supply of water testing as yours does, and always up to standard," said Jones, for as stated before, he had studied the subject quite thoroughly, "and I can also state that I now know some of the reasons my friends in the printing business swear by *Artesian* and *International Bonds*."

Whiting-Plover Paper Co.

Stevens Point, Wisconsin

Eastern Sales Agent—E. E. Lloyd Paper Co.

501 Fifth Avenue, New York City

Good Production

January production as reported to the American Paper and Pulp Association was 17 per cent in excess of December, and February, following such a high production month, only fell off 3 per cent from January. All grades, even those showing the smallest degree of prosperity, are reporting high production.

It is proper to record, also that while the average was 3 per cent less than in January, news print with its great volume of production, showed a falling off of 9 per cent, indicating that other grades had an actual increase in February over January to compensate for this falling off.

Confidence in Future

In general, therefore, it can be stated that the paper industry can properly assume an attitude of confidence that present conditions, if there is any material change, will only change for the better with the steady increase of the nation's consumption of paper.

REPORT OF SECRETARY

Dr. Hugh P. Baker, the secretary-treasurer of the association, presented the following report:

The year ending March 31, 1924, has been one of very definite accomplishment for the association. This accomplishment has been both along the line of increasingly effective service to the industry but particularly in the direction of changes which promise to put the association onto a sound financial basis for the future.

The year in the industry has been one of somewhat difficult adjustment to changing economic conditions, and yet the close of the year brings the conclusion that 1923 was pretty nearly a normal year in the industry, in fact rather more normal than any year since 1914. If economists serving the business interests of the country are correct, the paper industry, like other great industries of the country, is facing a period of slowly declining prices, during which competition at home and abroad will be exceedingly keen, probably making it necessary to do business on a narrower margin of profit. This will doubtless be a period in which the high-cost mill or mine or factory will gradually find itself unable to meet competition with the low-cost mill or factory.

It was emphasized in the report of the secretary last year that if there is ever a time when a trade association should be of service to the manufacturer, it is in a period of difficult business adjustment. The past year's experience has proven this assertion in that the well organized associations have been giving more effective service to the groups which they represent, and the less well organized associations have felt keenly the demands of their membership for greater efficiency. There is a growing appreciation in industry that a well organized trade association stands for definite accomplishments in the industry which it serves, and further that the trade association is in fact a part of American industry and, therefore, must play an increasingly important part in the economic development of the country.

Possibly some of the associations in the paper industry and in some other industries have concluded hastily that business conditions warrant doing certain things that are generally recognized as activities that may lead to difficulties under the law. What a legitimate association may and may not do has been very clearly established, and there is no need today for either a secretary of a trade association or the members of that association pleading ignorance of what may be done under our present anti-trust legislation.

Service by the Association

There are two forms of service given by associations in the paper industry to their members. The first and most effective form is what is called Direct Service; such as, statistical activity, holding of meetings, reports on traffic and transportation and the personal work of the secretary. The second form of service is the representation of the group which the association serves with other groups in the industry or with other industries, the watching of helpful and harmful legislation which the association is always in a position to work aggressively for and against, and finally the representation of the industry before the public.

American Paper and Pulp has been able to develop through closer and more harmonious work with affiliated associations, forms of very direct service to the paper industry. Some of the most important phases of this direct service are:

1. Monthly statistical summary of the paper industry.
2. Weekly statistical reports for groups not served by organized groups, or groups without a paid secretary.
3. Monthly statistical reports on imported pulp and paper.
4. Quarterly reports on pulpwood situation.
5. A printed monthly bulletin which in no sense competes with the trade papers, but rather takes the place of form letters or special mimeographed reports.
6. Reports on general economic conditions affecting the entire industry.
7. Special import service dealing with the difficult situation confronting the industry in the way of papers being imported under wrong classification and undervalued.

EMERGENCY SERVICE. Meeting emergency needs in the industry in the way of coal, pulpwood, casein, tariff, etc.

MEETINGS AND CONFERENCES.

ARBITRATION. Assisting mills not served in this activity by affiliated associations in arbitrating difficulties between the buyer and the seller.

INDIRECT SERVICE. 1. Representing the industry—with other industries, with the government, and before the public. 2. Contacts of helpful character with the National Industrial Conference Board, Chamber of Commerce of the United States, Association of Wood-Using Industries, etc. 3. Contacts with foreign countries with purpose of keeping the industry informed on foreign conditions.

Committee Activities

Two years ago the policy was adopted of doing away with standing committees in the association and their replacement by special committees to do a particular piece of work. The standing committees have been continued only as there seems to be a special work to be done during the year. This policy has proven to be a wise one, in that a standing committee that does not have regular work to do soon comes to feel that it is of little service, and that possibly if the committee is not active the association, itself, is not active.

Probably the outstanding committee activity during the year has been the development of an Advisory Committee from the Paper Industry for the Department of Agriculture. This committee is made up of representative men from the entire industry, whether members of the association or not, and during February held an exceedingly interesting meeting in Washington with Secretaries Hoover and Wallace.

The principal committee activity in the industry itself has been the formation of a Committee on Perpetuation of the Paper Industry of the United States, of which Mr. Henry W. Stokes, president of the association, is chairman. This committee has been carrying on some exceedingly interesting work.

Woodlands Section

The Woodlands section was organized in 1920 for the purpose of bringing together executives and their assistants having to do with woodlands. Since its organization the section has been able to provide the industry with accurate and timely statistics as to the wood situation, and it has increased the effectiveness of these statistics by graphs and charts. The section has as its purpose not only statistics but it is working to increase the efficiency of woods operations in the industry, to encourage the practice of forestry on timberland holdings, and to provide a medium for gathering and dissemination of information which will promote

A. P. W. PAPER CO.

ALBANY, N. Y.

Manufacturer of

Toilet Paper
and
Paper Towels

the permanency of the woods operations of the pulp and paper industry.

Wood is the raw material of a large part of the industry, and it is increasingly important that we should have information of an accurate character as to available supplies of wood, both in this country and in Canada, and how to make these supplies permanent for the industry.

Mr. O. M. Porter, assistant secretary of the association, has been secretary of the Woodlands section and has developed this work very effectively. His report upon the work of the section for the year appears elsewhere in this bulletin.

Information Service

This service was organized in 1921 under a special fund contributed to the association both by members and non-members. Warren B. Bullock, a trained newspaper man, was placed in charge and he has made this service of very distinct value to the industry, particularly during the past year.

The industry itself, other national industries and the public are coming to the association as never before for information as to where various papers may be secured, how papers may be used for new purposes, and many other questions. It is important that the industry should have some agency through which this information can be given out, keeping in mind, of course, always that information given is accurate and truly representative of conditions in the industry.

The limited funds assured the association for 1923-24 makes it necessary to give up the information service. A Special Committee on Association Activities and Program, of which Mr. Norman W. Wilson is chairman, has studied the activities of the information service fully and believes that these activities have been of great value to the entire industry. Even with the necessity of discontinuing the information service this committee has recommended that the association carry on an information service through regular association channels.

The Paper and Import Situation

In the report of the secretary for the year 1922 the tendency toward a difficult competitive situation with foreign paper was referred to as follows:

"Great quantities of paper are being brought into this country under improper classification and, of course, to the detriment of the paper industry. The industry should have a man who understands thoroughly the importation of paper, who could keep close touch with the larger ports to see that paper is brought in under right classification, and secure information as to importations. Such work cannot be done with the present force of the association."

In the report of the secretary for 1923 reference was again made to the need for an aggressive import service as follows:

"A very important piece of work could be done for the industry by the association having in its employ a man who understands thoroughly the importation of pulp and paper. Every time that a shipment of paper is brought into this country undervalued or wrongly classified it injures the industry. No one can estimate the amount of paper that is being brought in and wrongly classified and undervalued. . . . The association is keeping in as close touch as it can with customs officials at the port of New York and elsewhere, and the specific cases which the customs officials of New York have brought to the attention of the association in the past six months are clearly indicative of the very great help which could be given the entire industry if this work could be handled in a more effective way. Furthermore, such a man could keep the industry thoroughly informed as to the pulp coming into this country, how much is in warehouses, etc. The value of this information does not need to be enlarged upon—your secretary is so convinced of the necessity of service along these lines that he will continue to emphasize them in the hope that eventually such service may be given—and the wonder will be then that the service was not given before."

The association has been keeping this import situation before its membership for more than two years not only through annual reports of the secretary but through repeated form letters and in the monthly bulletin of the association. Your secretary has appeared before regular meetings of the larger affiliated associations to explain the situation and emphasize the necessity for action. Finally, in November, 1923, after repeated efforts to get accurate information by letter, a conference of manufacturers was called at the Waldorf-Astoria. At the conference same twenty odd mills were represented and the situation was fully discussed and a resolution was passed urging the continuance of the work.

The difficulty all the way along has been that our manufacturers as a whole have not appreciated the emergency conditions, which might arise from the constant bringing in of these foreign papers. Complaints have been so general that it has been impossible to take different cases to the government officials concerned. There has been large correspondence carried on in an attempt to get specific evidence of papers wrongly classified and undervalued, but too often without success.

After a great deal of work certain cases were taken to Washington, but with little or no direct action because of the lack of evidence that such competition was actually injuring individual manufacturers within the industry.

If we are facing a period of declining prices with keener competition and lower margins of profit, there is greater necessity than ever that the association work more aggressively in meeting this situation.

The Salesmen's Association of the Paper Industry has emphasized the situation through advertisements in the trade press and at their annual meeting just completed. Out of the agitation and work of this association for the past two years and with the interest aroused by the work of the salesmen's association, it should not be necessary to continue to emphasize the necessity of action. There should be very definite action and that in a way that will meet the situation.

In presenting this situation during the past two years your secretary has asked that the association be given a customs expert to assist in the carrying on of the work. This same plan of action was presented before affiliated associations and at the November conference. The situation became so difficult in January that your officers decided to temporarily give up the work of the information service and discontinue the monthly bulletin, and put all of Mr. Bullock's time into the import situation. Results achieved have proven the wisdom of this action. While Mr. Bullock is not a customs expert, his training as a newspaper man makes him of great value in securing needed information. As there has come necessity for technical assistance in the determination of papers, etc., he has gone to Mr. W. G. MacNaughton, secretary of the Technical Association of the Pulp and Paper Industry, a technical man who has given very valuable assistance and who is ready to continue this assistance.

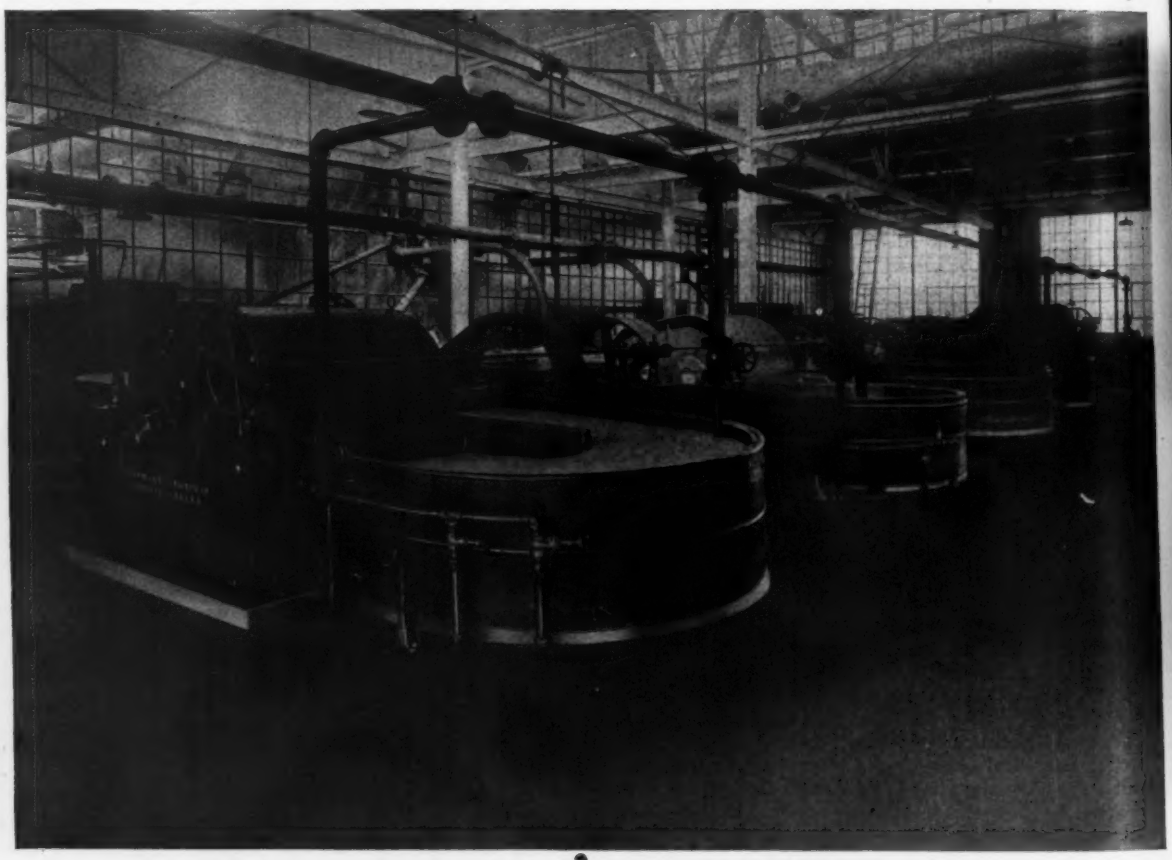
Your secretary recommends that the work which the association has been doing the past two years be strengthened at once by the addition of a customs expert. With the association machinery already functioning and with the experience which the association has already had, it seems that the results desired could be achieved at the expense of a single customs expert. When need arises for special legal assistance this could be financed by the groups concerned.

Income Tax Activities

In the report of your secretary in 1922, and again in 1923, the necessity for aggressive service to the industry along income tax lines was emphasized. Last year your Secretary urged the retention by the industry of an income tax expert. This suggestion was made because of the knowledge of what other industries and other national associations are doing in meeting their income tax problems.

Paper Mill M

That You Can De



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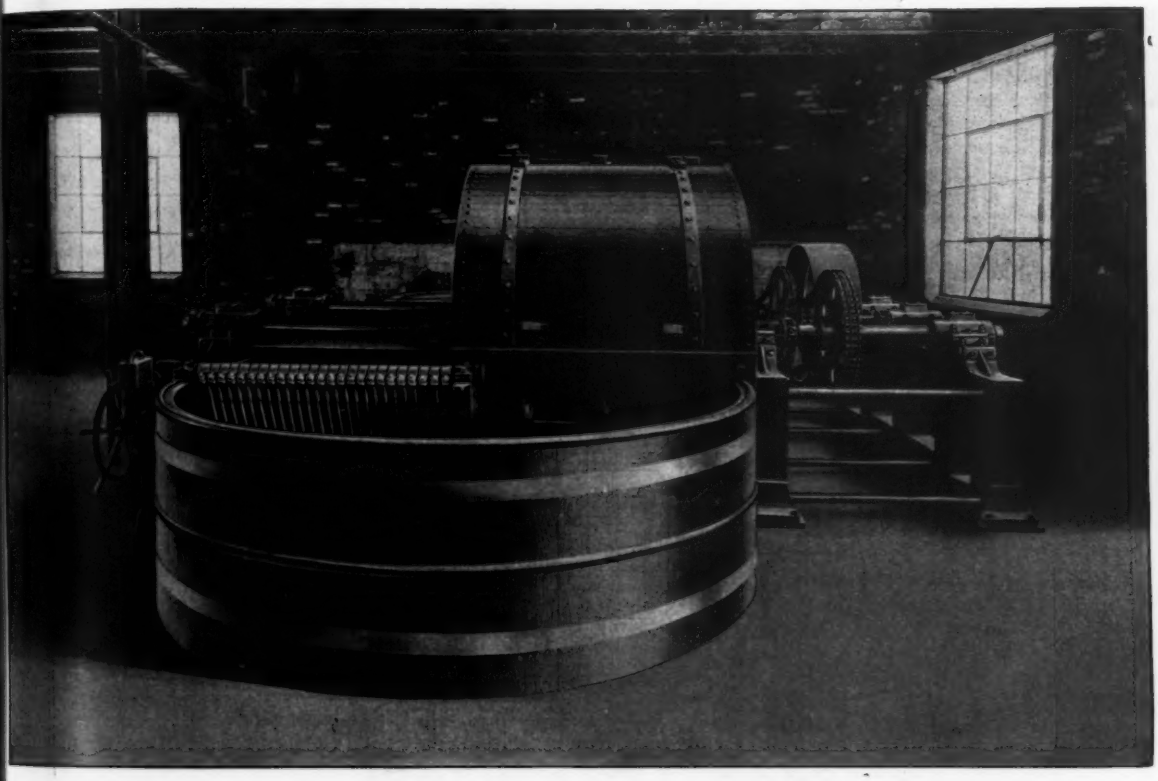

This Paper Pulping Engine Prepares 1500 Lbs. of Stock Every 30 Minutes for Light Board

ULPING ENGINES, BINDERSBOARD MACHINES, DUSTING MACHINERY, INIATURE JORDANS, BELT AND MOTOR DRIVEN JORDANS IN FOUR ITH ANTI-FRICTION BEARINGS AND .001" PLUG ADJUSTMENT, STUFF STEEL AND BRONZE.

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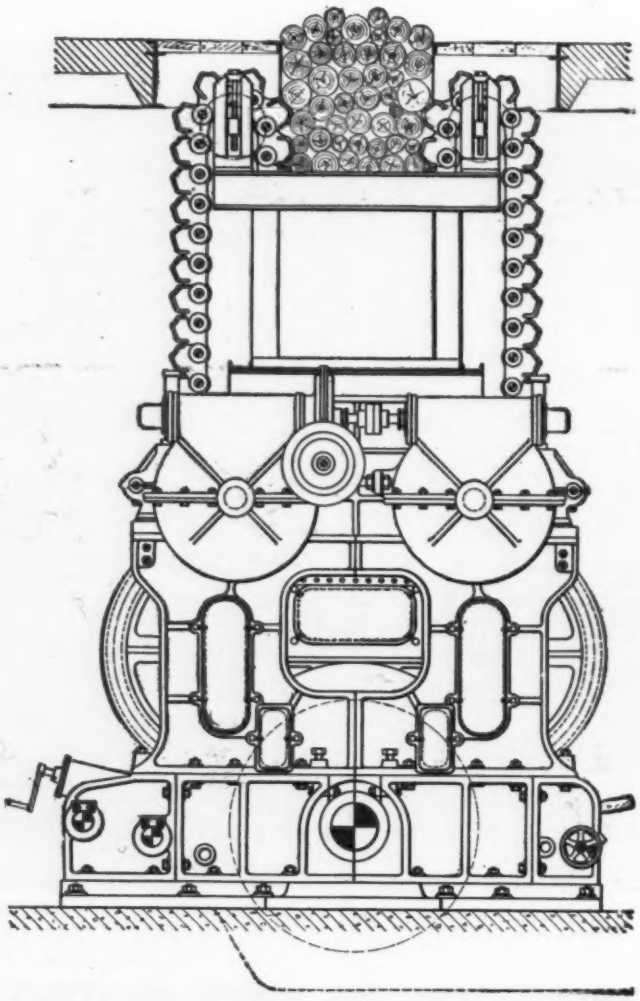

AMERICAN VOITH CONTACT CO., Inc.

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As in the case of the suggestion as to a customs expert, this suggestion as to an income tax expert was not considered of vital importance to the industry. Therefore, this Association urged the Cost Association of the Paper Industry to take up income tax work as a part of its service to the industry. That Association has been giving some very helpful service along income tax lines. The Cost Association should be supported much more generously by the industry, not only for the service which it may give along income tax lines but for the help which it can give in emphasizing the necessity for satisfactory cost work in the industry.

Contract With the Federal Government

Under this heading your Secretary has discussed in his reports of 1922 and 1923 the close contact which the Association is maintaining with various agencies of the federal government.

Last year it was stated—"It is safe to assume, and many of our manufacturers will assert as the result of more or less expensive experience, that the federal government is continuing with passing years to take greater cognizance of economic conditions generally and of the individual business of paper manufacturers, and all of the other manufacturers of the country. So long as this is the case it would appear to be wisdom for the industries generally to develop more effective co-operation as between the business men of the country and the federal government. To put it in another way, there are mighty few arguments against such co-operation."

Through the efforts of the Association the past four years to maintain the right contact with Washington, it is now generally appreciated among the government departments that this Association represents the industry, and when it speaks it speaks for the industry. This has been exceedingly helpful in getting the right consideration for the industry's problems at Washington.

Next Year

Your Secretary counts the past year and the year ahead better years as there comes greater opportunity for service and as he feels that the Association has made its work count for something in the up-building of the industry. As your secretary has become better acquainted with the industry and with the men making up the industry, he has come to appreciate that there are much greater opportunities for service before the Association than in the past, and he hopes that it may be possible to make these greater opportunities for service the means of protecting, promoting and perpetuating the industry.

Last year in his report the secretary stated:

"The fundamental need for the coming year is for a sounder and more effective method of financing this Association—If the Association is worth while it should be supported in a reasonably effective way, if it is not worth while the Association should be wiped off the slate and forgotten—The Association is worth while and three years of service with you has made me believe tremendously in the industry, if you men who make up the industry and in the Association itself."

The chronic financial difficulties of the Association finally came to a head in the early winter, just past, and your President, Mr. Stokes, took hold of the financial problem in a way that means a better Association.

Early last December the President appointed two Special Committees, one on Finance of which Mr. W. J. Raybold is Chairman and the other on Association Activities and Program, of which Mr. Norman W. Wilson is chairman. Owing to the fact that there was a deficit when your secretary came into the Association in 1920 and the fact that most of his service with the Association has been during a period of business depression, it has made it exceedingly difficult to meet the increasing demands for service and at the same time get the Association onto a sound financial condition.

You will hear today that Mr. Raybold's Special Committee, with the aggressive assistance of Mr. Stokes and Mr. Norman W. Wilson, and in fact of every member of the Association, has been able to raise funds sufficient to put the Association square with the world. This seemed like an impossible task when it was approached in December, 1923, but hard work has accomplished the seemingly impossible task and the Association opened this fiscal year on April 1, without deficit or financial obligation of any kind.

Another phase of the difficult financial situation was the irregular and uncertain method of financing the Association. The report of the Special Committee on Association Activities and Program, which will be presented today by its Chairman, Mr. Norman W. Wilson, will indicate the thorough study which this Committee has made of the Association's problems and the solution proposed by that Committee, if accepted by you, will put the Association onto a sound financial basis. In fact the acceptance of this report means a turning point in the life of the Association of very great importance. With direct financial support by the individual mills and, therefore, direct financial responsibility for the Association, we should be able to go forward not only on a sounder financial basis, but on the basis of sounder and more effective service.

The fundamental need for the year 1924-25 in the work of the Association is for a better personal contact between the working force of the Association and its membership. Four years of effort to develop more direct service has gradually brought the secretary and his assistant into closer contact with the manufacturers. This contact should be carried still further, for only as there is a real working contact between the staff and the manufacturers can the Association know accurately the need of the industry and meet those needs as members of the Association feel that they should be met.

Limited funds may prevent the staff from spending as much time in the field as they should spend. The luncheons held in the different paper-making sections last year were very helpful and in the long run are less expensive than it would be for the secretary to spend enough time in any given section to meet the executives who would attend a luncheon in a group. These luncheons should be continued, that there may be discussion of the vital problems in the industry rather more than the problems of the Association.

There are other needs to be met in the work of the Association, but now that the financial burden has been lifted from the Association it should be possible for the Association staff to be more effective in all of their work.

ACTIVITIES AND PROGRAM

Because of the chronic financial difficulties from which the Association has been suffering the past few years, and with the belief that these difficulties could be met by certain changes in form of organization, and in financing, the president of the association, Mr. Henry W. Stokes, appointed the following committee on December 4, 1923:

Norman W. Wilson, Hammermill Paper Company, chairman.
H. W. Ellerson, Albemarle Paper Mfg. Company.
Frank E. Taylor, Advertisers' Paper Mills.
D. C. Everest, Marathon Paper Mills Company.
C. R. McMillen, Union Bag and Paper Corp.

Meetings of the Committee

The committee has met in the association offices, separately and in conjunction with meeting of the special Finance Committee, on the following dates: January 23, 1924; February 15, 1924; March 25, 1924.

During these meetings there was full discussion of the present form of organization of the association and the relation of the association to its affiliated associations. It was found that discussion of the form of organization of American Paper and Pulp and its relation to affiliated associations could not be separated from the question of financing the association. Therefore, the recommendations of the committee cover both form of organization and methods of financing.

Announcement

Attention of the Paper Industry is Directed to our new line of

CYCLOIDAL VACUUM PUMPS

Designed and Built for Paper Mill Work. Important New Features. All Parts Coming in Contact with Liquid Are Made from Special Acid-resisting Chilled Iron. The Use of Bronze Pumps No Longer Necessary Except for Very Special Conditions. All Parts Interchangeable.

MILLSPAUGH SUCTION ROLLS

Over 1000 Millspaugh Suction Rolls Sold to Date. One Company Ordered 9 Rolls in February. 25 Rolls on Order in Our Shop March 1.

The Sandusky Foundry & Machine Company

Sandusky, Ohio

(Member of Copper & Brass Research Association)

Form of Organization

It is recommended that there be no essential change in the form of the association or in the relation of the association to its affiliated associations. The association can function most effectively by continuing as the federated organization of the paper industry, with other associations in the industry as affiliated associations.

To facilitate the work of the association, however, it is recommended that the present Executive Committee, which is made up of the elected officers of the association, the past presidents, and the presidents of affiliated associations, be changed to an Advisory Council, which may meet at least once each year for discussion of the work of the association for the industry.

It is recommended also that there be an executive committee consisting of elected officers of the association and five other executives in the industry, who shall be elected at the same time and in the same way as the president and vice-presidents of the association. The president of the association shall be chairman of the Executive Committee.

Activities of the American Paper and Pulp Association

It is recommended that the association continue to function as in the past, for the protection, promotion and perpetuation of the paper industry of the United States.

It is recommended that the program for the association's activities in 1924-25 feature the following:

Representing the Industry. Such activity is fundamental to the character of the association. It means representing the industry at Washington, at various state capitols, in paper-making states, with other industries, and before the public.

Statistics. The statistical activities of the association to cover general statistics for the entire paper industry, import and export reports, and such detailed statistical reports as may be needed. The association to co-operate with affiliated associations and thus avoid duplicating the activities of those associations.

Tariff and Import Service. As the association is organized to protect and promote the paper industry of the country, it must take a definite stand in tariff matters for the ultimate good of the entire industry. Any activities which are necessitated by the tariff law or changes in it, must be carried on in such a way as to represent all groups of the industry, and for the upbuilding of the industry. Tariff service is in a sense an emergency service, which must at all times be guided by the Executive Committee of the association. The industry is meeting very difficult competition from foreign pulp and paper. The association should continue its efforts to prevent the dumping of foreign pulp and paper on to the markets of this country, and the entrance of paper wrongly classified and undervalued.

Emergency Service. As the association has been able, repeatedly in the past, to meet emergency needs in the industry, so it should continue to serve the entire industry and affiliated associations in such emergency matters as 1, Tariff; 2, Coal; 3, Pulpwood; 4, Casein, etc., etc.

Cost and Income Tax Service. It is recommended that the association be more active in developing cost education throughout the industry, and that the industry itself should support the Cost Association much more effectively than at present. The work of the Cost Association of the Paper Industry, which is a separate organization, has been carefully analyzed, and it is believed that the Cost Association is doing work of vital importance to the industry along cost lines, and particularly in service to the industry on income tax matters. It would tend toward both efficiency and economy were the Cost Association a cost section of the American Paper and Pulp Association, so that its cost and income tax service might be given to all members. This can be done only when and if the industry provides the necessary funds. Such an amalgamation is not contemplated at the present time.

Legislation. The association should continue with even greater aggressiveness its protection of the industry from harmful legislation at Washington and in state legislatures, and should use its influence in furthering helpful legislation.

Information. The association must of necessity serve the industry as a source of information relative to the industry here and abroad. The limited funds assured the association for 1924-25 makes it necessary to give up the Information Service, as it has been known during the past three years. The committee has studied the activities of the Information Service carefully, however, and believes that these activities have been of great value to the entire industry. It recommends that the association carry on limited information service as funds permit.

Raw Material. The committee recommends that the association continue ever more aggressively its efforts to insure the industry a permanency of raw materials, such as rags, paper stock, pulpwood, etc. During the past three years the association has allocated certain sums of money annually for the support of the work of the Woodlands Section. Last year this amount was $2,000, which covered in part the salary of the assistant secretary. The proposed budget will not permit of the continued support of this work. It recommends, however, that the association continue its general work through its regular force for the maintenance of a permanent supply of raw materials, and that the Woodlands Section be reorganized so as to give special association service to the manufacturers owning timberlands, along the lines of forest management, fire prevention and suppression, logging operations, reforestation, etc.

Meetings and Conferences. In addition to carrying on its general work for the industry, in arranging for conventions and meetings, the association is in a position to handle the general association and statistical work of such of its smaller affiliated associations as do not have paid secretaries, at cost to the affiliated association, thus maintaining the organizations of these associations for emergency action and unifying the general statistical activities of the industry.

Arbitration. It is recommended that the association extend its service in arbitrating difficulties between the buyer and the seller, particularly for mills in the Unclassified Division of the association, or for members of those affiliated associations which do not give direct arbitration service. The association should not extend this service into groups where the service is already under way, unless specifically requested to do so.

Financing the Association

The American Paper and Pulp Association is a business organization, in existence to serve the paper industry in a practical business-like way. The committee believes that as the industry learns more of the character of service given by the association it will finance the association so as to adequately meet the needs of the industry.

With an assured and known income which can be made the basis of annual budgets the association can give more effective service to the industry than has been possible in the past where income has been irregular and uncertain.

It is recommended that the association continue as a federated organization with affiliated associations continuing as organization members on a nominal membership fee of from $100 to $300 per year. The committee believes that such an arrangement will not change in any way the present harmonious relations which the association has with its affiliated associations.

It is also recommended that the association continue the plan inaugurated this year of going directly to the mills, both to those members of its affiliated associations and to its own individual unclassified members, for annual membership pledges, and that, bsaed upon the pledged amount, the Executive Committee fix the budget for the following year at its last meeting in any fiscal year prior to the year during which the budget will be effective.

Finally it is recommended that the secretary-treasurer shall submit monthly full statements as to the financial condition and the

Mills of RHINELANDER PAPER CO., RHINELANDER, WIS., H. C. Hanke, Mgr.

Manufacturer of

Glassine
Greaseproof

Machine Glazed Wrapping
Machine Glazed Tissue in bleached and unbleached stock

activities of the association to members of the Executive Committee.

NORMAN W. WILSON, Chairman of Committee.

Submitted by the committee to the Executive Committee of the association in regular meeting on March 26, 1924, where full discussion was given. The Executive Committee accepted the report and requested the chairman to present report for action at the forty-seventh annual meeting on April 10, 1924.

HUGH P. BAKER, Secretary.

REPORT ON IMPORT INVESTIGATIONS

Investigations of abuses of the customs laws, carried on by the American Paper and Pulp Association for many months past, warrant the following summary of conditions as seen by officers of the association:

1. Abuses of the laws have resulted in the bringing into this country of paper in such a manner as to cause a serious disturbance of the domestic market in many grades of paper.

2. The effects have been rather due to the psychological reaction to the broadcasting of offers of small quantities of paper at absurdly low prices than to any actual large quantity imports of such paper.

3. Pernicious activity of the importers is rendered more serious by the engaging of specialists from the customs department to serve the importers as counsel.

(a) Legislation should be sought to prevent any government official's retainer by outside interests for practice before any government bureau in which he has been employed within a period of two years.

(b) The industry should use its efforts to secure for the customs division of the Treasury Department such salaries and additional assistance as may make it possible to keep in the government service these trained men of ability, and to give them sufficient assistance as they need to function most effectively.

4. Customs abuses involve the improper classification of foreign papers offered for import into this country, the dumping of foreign papers at less than the prices in the country of origin, and the criminal undervaluation of paper when it is brought into this country.

(a) Legislation is needed to make possible the collection of the proper duty upon paper which has been improperly classified, when it is found, after the fact of such importation, that the importers have successfully evaded the customs laws.

(b) Great difficulty is encountered under the provision that proof of injury must be presented by domestic manufacturers, before a ruling of dumping can be maintained. At present the customs authorities are forced to secure specific evidence of injury to individual manufacturers before a dumping ruling can be made; the successful sale of such "dumped" paper in competition with domestic manufacturers should be sufficient evidence of injury to American industry.

The details of the work done by the association in its efforts to eliminate unfair competition from abroad would make an over-long report. It may be stated, however, that the investigations show that the importers are using the blanket provisions of the clauses providing duty-free entry of news print, and the clauses fixing duties on "printing" and wrapping papers as a cloak for constant efforts to get paper into the county improperly.

In view of the widespread nature of these efforts, the customs service is to be complimented upon its vigilance in enforcing the collection of proper duties. The wonder is, not so much that much paper is coming in improperly, as that so many importations are caught and reclassified before they are offered in the domestic markets.

The chief abuses under the mis-classification headings are the efforts to bring in book paper as standard news, parchmentized paper (later marketed as parchment) as wrapping paper, typewriter paper as printing paper, and valuable special papers under the blanket clauses printing paper and wrapping paper.

The pending cases under the anti-dumping statute are chiefly on Canadian kraft, many shipments of which are now under investigation.

Under-valuation cases are handled directly by the customs authorities, through close contact with paper prices abroad.

The entire import situation involves highly complex problems, both of customs law and customs, and of technical character of paper being brought into this country.

As a result of the activities of the American Paper and Pulp Association, many importers who had been devoting every effort toward tricking the government agents, are now more careful to enter their imports in conformity with the law.

It should be stated that many importers, men of high repute and honorable character, have been careful to conduct their foreign business in accordance with the spirit and the letter of the law. Others, however, less scrupulous, are no better than the bootleggers of "Rum Row," devoting every effort to swindle the government by evasion of the law, to the detriment of honest business. It is against this unfair competition that American industry is justified in conducting a relentless warfare.

WOOD PULP STATEMENT

E. W. Kiefer, president of the Port Huron Sulphite Pulp and Paper Company, presented the following statement on wood pulp:

"Seven years ago I happened to address you on the subject of pulp and the expansion then taking place in industry and the effect it was likely to have, and it may be well to recall the situation at that time in an effort to properly evaluate the present.

"Before the war domestic manufacturers were shipping 9,000 tons of unbleached sulphite pulp which they had increased to 15,000 tons per month to take the place of the 6,000 tons per month previously received from Germany and Austria Hungary.

"During the last year 1923 these countries had fully recovered their position in the American market by shipping 85,000 tons of unbleached and bleached chemical pulp against the same amount in 1912. In addition to this Norway has slightly increased her shipments from 82,000 to 87,000.

"Sweden has increased 3 fold from 121,000 to 319,000 and Finland has made the astonishing jump from 4,000 tons to 102,000 tons, or the total importation from European countries has risen from 1,000 tons per day to 2,000 tons per day. Canada has gone from 53,000 tons to 777,000 tons, or our total importations have risen from 353,000 tons to 1,377,000 tons, nearly four times as much, in the last ten years.

"While this has been taking place the production of American Sulphite has remained stationary or slightly declined from 1,450,000 to 1,375,000 tons and soda in about the same proportion from 437,000 tons to 419,000 tons. Kraft jumping from 85,000 to 243,000 tons, due mainly to the building of southern mills which expansion is still going on at a rapid rate.

"Now these statistics are interesting when analyzed but in view of the fact that European imports of ground wood have risen from 4,000 tons to 66,000 tons, we may as well proceed directly to the point, and that is that European pulp wood will continue to come over in constantly increasing quantities in the shape of ground wood and chemical pulp and news print until the cost of the wood at the mills in the two continents is approximately equal.

"The traditional difference in labor cost will favor the European producer and become as in past years just about equal to his ocean freight. The cost of wood at the mills making their own pulp cannot exceed the European's price plus the freight of that pulp to the American mill.

"Now what is that cost of wood and how are we to face the issue. I had the pleasure of recently being invited by the President of one of the large Baltic Mills who was quite frank about his operations.

"His wood cost us equivalent to $9.00 per rough cord of 128 cu. ft. laid down at his mill. Now inasmuch as his company has prac-

Imported Chemical Pulp

A-1 Bleached Sulphite
Mills at Sarpsborg, Norway

E. B. Bleached Sulphite
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Vestfos Easy Bleaching Sulphite
Mills at Vestfossen, Norway

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ticed forestry for some forty years and has nearly 800,000 acres under its management it seemed unlikely to him that his wood cost would change materially in years to come, in other words, this cost was a staple cost based on cost of raising, cutting, etc., and not as with us, constantly being driven upward by depletion of a natural resource.

"In pre-war years the price of pulpwood was fairly steady at $6.75 per cord, averaging the rough and peeled which has advanced to $10.50 on board cars or vessel at point of shipment an advance of 55 per cent which is not much more than the advance of other commodities but when we consider the rise of the cost of transportation due to various causes but mainly that of greater distance, and we see that the price at the mill has jumped from about $10.00 to $20.00, that the real significance of the European's staple price of $9.00 per cord at the mill is fully appreciated.

"It is plain to be seen that as long as the European has the advantage of $18.00 to $20.00 per ton on the manufactured pulp that this advantage is not to be offset by an ocean freight of some $5.00 plus a rail freight of $7.00 per ton and that the American manufacturer cannot even afford to make pulp for himself much less sell it unless his wood cost is not over $30.00 per ton of pulp, unless he is making a very special product.

"Not only has this situation practically stopped the manufacture of sulphite for sale but there is great question whether it has not also stopped the growing of trees on this continent in competition with European forestry before ours has even gotten fairly started. Unless your woodlands are in your own back yard it would indeed be a brave man who would venture on a policy which would entail millions of dollars on an enterprise unprotected by any tariff and in competition with a strongly intrenched and low cost competitor.

"So we may at once boldly come to the conclusion that wherever paper prices are based on our wood costs and not on European pulp they will not endure and we must do what is necessary to set our house in order either by using imported pulps or by bringing our costs to an equivalent basis. So far it seems that the tendency to do this has shown itself in the closing down of the smaller and weaker mills and the building of the larger ones.

"In conclusion I wish to leave this thought with you that only by intense specialization will the day be saved and a reasonable profit assured. Concentrate on as few lines as possible instead of as varied a product as possible."

COARSE PAPER STATEMENT

C. R. McMillan, of the Union Bag and Paper Company, next discussed the prospects of the coarse paper division of the industry. His speech reviewed the situation in the paper business briefly since its beginning, and the general tenor of the address was far from cheerful. He pointed out that there is too little specialization and centralization in the industry and remarked that the general direction is in too many hands to make it successful.

"As a whole the paper industry has not had a particularly prosperous time," he said. "On the average it does not yield reasonable profits to the manufacturers and dealers. Of the sixteen leading industries in the country the paper business stands fifteenth. It is composed of more integral parts proportionately than any of the others, and the net investment is scattered through too many companies."

He then cited the iron and steel industry, in which he said one company represented fifty per cent of the net investment, and others to show what he meant. He also cited figures from Lockwood's Directory to prove that there were too many mills operating in the coarse paper division.

"There are 250 men attempting to manage the fleet of 125 boats," he continued. "Until they all learn to use the same chart and compass, or until the number of ships in the fleet is cut down to smaller and stauncher units I can see little hope for the coarse paper industry."

FINE PAPER STATEMENT

Charles McKernan, of the B. D. Rising Paper Company, discussed the fine paper situation briefly. He, too, was not particularly optimistic, and pointed to the fact that the business had not been nearly as prosperous during 1923 as everyone had expected.

"History is never as cheerful as prophecy," he remarked. "We met here last year and everyone was very optimistic. Things went along well until April, when something put a monkey wrench into the machinery and things slowed down. There has been some improvement since then, but at the present time the writing mills are operating at only about 95 per cent of normal capacity, which is, of course, an entirely different proposition from our capacity.

"The cost of rags has also increased about 21 per cent in the past year. These are dependent on the cost of cotton and the amount of production in the cotton mills. On the other hand, we have profited somewhat by the lower cost of pulp, and freight service has greatly improved. I shall make no prophecy but leave you to draw your own conclusions."

WOODLANDS SECTION

Interesting programs were presented at the meetings of the Woodlands Section, held on Wednesday. At the morning session, Chairman C. W. Hurtubis of the Hammermill Paper Company welcomed the members and guests and Secretary-Treasurer O. M. Porter made his annual report.

Samuel T. Dana, director of the Northeastern Forest Experiment Station, addressed the meeting on the work the station is doing. He said in part:

"The Northeastern Forest Experiment Station is a very young organization with a very big job. It was established during the summer of 1923 with headquarters at Amherst, Mass., for the purpose of doing in forestry the same sort of thing that the agricultural experiment stations have been doing in agriculture. Its main task is, therefore, nothing less than to determine the fundamental facts and principles on which sound forest practice must be based.

"Aside from specific studies, an important result of the establishment of the Northeastern Forest Experiment Station has been the organization of a Forest Research Council. This is a body composed of seventeen men appointed by the Secretary of Agriculture who are already engaged in or interested in the results of forest research. The function is to act in an advisory capacity not only to the experiment station but also to other forest research agencies.

"The station looks forward to conducting a considerable part of its work in the closest possible coordination with the pulp and paper industry. Representatives of the industry are included in the council one of the members of which is chairman of the sub-committee for the Northeastern Station appointed by the advisory committee of the pulp and paper industry to the Department of Agriculture. Substations will also in all probability be located in parts of the region in which the industry is particularly interested. Suggestions as to desirable sites for sub-stations as well as to problems in need of investigation and as to any other activities of the station will be gladly received."

H. B. Shepard, forest engineer, spoke on: "Pulpwood Supplies—Can a Paper Company Afford to Spend Money on its Timberlands to Insure Increased Production?"

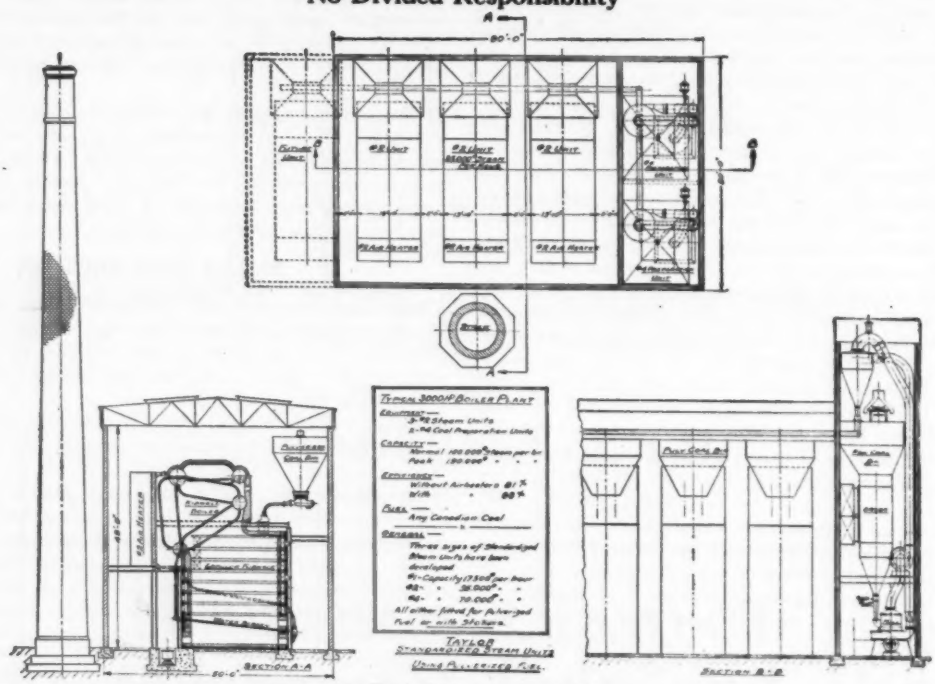
In opening his talk he said the objection is sometimes made that paper companies cannot afford to spend money for forestry because of competition from concerns who would not practice it. Money spent for forestry would have to come out of profits to a prohibitive degree.

He pointed out nine reasons why this contention is not true. In closing, he said:

"Each individual company must study its own situation. The

New Standardized Steam Generating Units

No Divided Responsibility



A Typical Arrangement of

Three Taylor Steam Generating Units.
Two Lopulco Coal Preparation Units.

Guaranteed efficiency 81% to 89% depending on whether or not air heater units are included.

All coals are burned with practically the same high efficiency.

Wet wood or bark refuse may be burned simultaneously with pulverized coal.

There will be no banking losses.

The boilers deliver steam which is CLEAN and superheated 15 to 40 degrees.

Immediate and previously unequalled response to sudden overloads.

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Three sizes of standardized steam units have been developed.

1—17,500 lbs. steam per hr.— 500 B.H.P.
2—35,000 lbs. steam per hr.—1,000 B.H.P.
4—70,000 lbs. steam per hr.—2,000 B.H.P.

Any two units will carry the normal load of three units for 8 hours.

Units are equipped for either pulverized fuel or stokers to suit conditions.

The complete units are delivered and erected on your foundations and their performance is guaranteed.

COMBUSTION ENGINEERING CORPORATION
POWER PLANT LIMITED EQUIPMENT

STOKERS OF ALL TYPES
PULVERIZED FUEL SYSTEMS
STEAM TURBO-GENERATORS
HIGH SPEED STEAM ENGINES
WATER TUBE BOILERS

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actual detail of procedure will vary somewhat in different places, but experienced foresters can analyze situations and draw up proper plans, if given the opportunity, that will meet the needs of most of the companies that have today a reasonable amount of wood under control. Forest maintenance cannot be had except through the applications of forest management under the direction of experienced foresters. There is need for immediate action, not only because of the need for attention to the second growth pulpwood in order that its possibilities may not suffer but because there is barely time to grow the next crop of wood before the present stand is exhausted."

Major E. W. Kelley of the United States Forest Service spoke on "Forest Organization for Fire Control."

The afternoon session was held in conjunction with the Technical Association. Three speakers were scheduled: E. S. Bryant, Consulting Forester, on "Elimination of Waste and the Reduction of Logging Operation Costs"; John D. Rue, U. S. Forest Products Laboratory, and John E. Alexander of the Nekoosa-Edwards Paper Company, on "Pulpwood Decay"; Prof. Samuel N. Spring, professor of Silviculture at Cornell University on "Commercial Reforestation."

Prof. Spring in the course of his talk, said:

"Just at present reforestation is popular, is being given great emphasis and has a real place in the progress of forestry. Nevertheless, it is not a prescription to be used for every case any more than one would adopt one recipe in cooking.

"To assure permanent, future supplies of pulpwood, annually available, it is evident that we must have an adequate area of young growth replacing forests that are being cut. This of course includes full protection from fire and other damage. Without reproduction utilization will be temporary, not permanent and hence future supplies will not be forthcoming.

"If the objective of a company is toward permanency of its industry then that company is likely to consider the productiveness of its property. If it is not permanent then expenditures direct or indirect to accomplish reproduction are likely to be disregarded unless the improvement of the property looking toward future sale influences the owners.

"I am as much opposed to irrational enthusiasm for reforestation as I am for dyed-in-the-wool conservatism that takes no account of future productiveness of forest lands. Forestry is constructive, but as a profit, although under some conditions that is bound to be a deferred profit.

"The preparation and use of a planting plan is to my mind the fundamental basis for successful reforestation. The next essential is good quality trees at a reasonable price. Generally speaking, prices of trees from commercial nurseries seem prohibitive for commercial planting by companies, unless contract arrangements for large lots annually can be made. In these states maintaining nurseries for production of stock for sale at cost, or for free distribution, trees may advantageously be secured. The only other alternative is to raise one's own seedlings. For large operations this is the best course, other conditions being equal. It demands a carefully prepared nursery plan, based on the information afforded by the planting plan. In this I wish again to emphasize the need for carefully planned procedure and not haphazard work. Next and equal in importance is the superintendent of the nursery. Here one wants a good gardner, who can make things grow. Under a competent forester, such a man is by far the best type to secure and one can be reasonably assured of successful propagation of stock at a satisfactory figure.

"Broadly speaking, successful reforestation rests first on the choice of species suitable to the site, second upon systematic detailed plans carried out with regard, at every point, to cost reduction to the minimum. That minimum is the lowest cost at which trees of good quality can be grown, or purchases, transported and planted so that a complete restocking of the land with thrifty trees is secured.

The Section re-elected its last year's officers. They are as follows:

Chairman, C. W. Hurtubis, Hammermill Paper Company, Erie, Pa.

George N. Ostrander, Finch-Pruyn & Co., Inc., Glens Falls, N. Y.

Executive Committee, C. W. Hurtubis of Hammermill Paper Company, of Erie, Pa.; George N. Ostrander, of Finch-Pruyn & Co., of Glens Falls, N. Y.; D. E. Lauderborn, of the Pejobscot Paper Company, of Brunswick, Me., Edward S. Bryant, of Boston. Secretary and Treasurer, O. M. Porter.

Forestry Committee, New England Division, P. T. Coolidge, E. S. Bryant, D. A. Crocker, D. E. Lauderburn, H. P. Morse.

New York Division, A. B. Recknagel, R. S. Kellogg, H. L. Churchill, F. A. Gaylord, J. E. Rothery.

Lake States Division, J. B. Wells.

Members-at-large, E. S. Halloway and Ellwood Wilson.

SALESMEN'S ASSOCIATION

The Salesmen's Association of the Paper Association adopted a resolution at its meeting on Tuesday definitely charging that cheap foreign paper was being brought into this country under false classification to evade the customs law. It called on the parent organization to take immediate action to stop this practice and pledged itself to 100 per cent co-operation.

The resolution, which was introduced by George K. Gibson, of the Wasau Sulphate Fiber Company and was unanimously carried, admitted that the American manufacturers are unable to cope with the situation without concerted action. The resolution follows:

"Whereas the paper industry of the United States is suffering from the continued and increasing volume of cheap made foreign paper imported and put upon the market of the United States at prices less than the said important papers can be produced in the mills of the United States, and

"Whereas the paper mills of the United States are wholly unable to meet this pirate competition due to the fact that they must pay their American workmen the highest prices for labor on earth and also the consequent high raw material transportation and tax charged.

"Whereas charges are freely made and widely circulated to the effect that quantities of this cheap and foreign paper are coming into this country falsely classified and evading the customs law of the land and

"Whereas these import abuses and crimes demand that the entire membership of the paper industry in the United States do immediately create and erect some adequate and powerful agency which shall put an end to this strangling menace to our industrial prosperity and

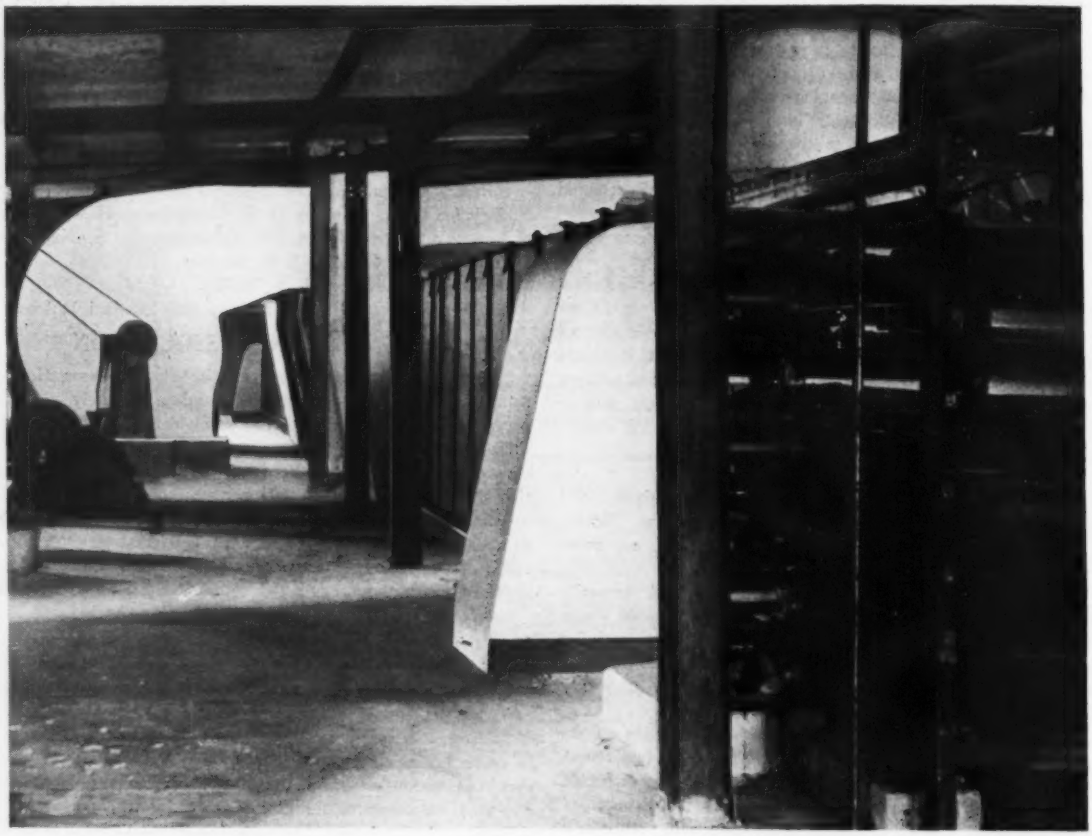
"Whereas the paper industry in the United States is today without any such powerful and adequate agency for the purpose required and

"Whereas, it appears that the one sole reason why no such immediate competent and adequate measures are available to cope with this import menace is because of the lack of some comprehensive plan backed by sufficient funds to make it effective and

"Whereas, we believe that our American paper markets exist primarily for the benefit of the American manufacturers, workmen and consumers and further that American people will buy American paper to the exclusion of cheap made foreign made paper products if they be shown the perils that confront their American industry and

"Whereas, we believe that the perfection and adoption of some adequate plan backed by the sufficient funds directed by the American paper industry as a whole is the proper manner in which to proceed to educate the buyers of the United States in favor of the American paper products and to correct and put a stop to the unlimited entry of the cheap made foreign papers into this country.

"Therefore, be it resolved by the members of the Salesmen's Association of the Paper Industry in annual meeting assembled on this



BOARD DRYING

We have just published an illustrated bulletin describing the many uses of the COE AUTOMATIC ROLLER DRYER for drying thick paper or composition boards, from 1/16″ to 1″ thick, such as BINDERS' BOARD, LEATHER BOARD, FIBRE WALL BOARD, INSULATION, PLASTER WALL BOARD, and other products of wet machines, pasters, and presses.

This dryer is a continuous machine for rapid uniform drying of flat boards and while comparatively new to the industry is in successful use by several large firms with great economy and savings.

If you are not familiar with the continuous ROLLER DRYER it may pay you to become acquainted with its possibilities. We will be glad to send copies of this new bulletin to all parties interested in the subject of BOARD DRYING.

THE COE MANUFACTURING CO.

Painesville, Ohio

Western Representative
H. R. Masters
549 W. Washington Blvd.
Chicago, Illinois

Eastern Representative
J. O. Ross Eng. Corp.
30 East 42nd St.
New York City

eighth day of April, 1924, that we do hereby call upon the executives of the American Paper and Pulp Association to take some immediate action toward the adoption of some adequate plan backed by the requisite funds necessary for the protection of the American paper market from the invasion of the cheap made foreign paper products, and be it further

"Resolved, that the Salesmen's Association of the Paper Industry pledges 100 per cent co-operation to the American Paper and Pulp Association in any and all efforts it may undertake for the adequate grappling with this huge problem.

"Resolved, that a copy of these resolutions be transmitted by this association to the president and secretary of the American Paper and Pulp Association with the request that the subject matter of these resolutions be made a matter of consideration at their annual meeting on Thursday next, April 10."

Francis H. Sisson of the Guaranty Trust Company in his address before the meeting said in part:

"Basically, business conditions throughout the country are progressing satisfactorily, but there is a tendency on the part of business interests to await tax reductions before undertaking further forward movement. The plethora of money in the banks is due in part to high taxes and the resulting disinclination of investors to let their funds move into regular investment channels. In fact, had the tax bill passed as introduced by the Administration shortly after Congress convened, the country would probably have experienced a material increase in business and a general stimulation of industrial activity.

"Pessimism in regard to the future finds little justification at the present time. Only a catastrophe can check its upward and onward course and the possibility of such a catastrophe now seems remote. Experience has always shown that in the last analysis the conservative forces of the United States remain dominant. This is the year of a presidential election and coming months will no doubt be characterized by a certain hesitation in business. These influences, however, are essentially temporary in their effect and should not seriously retard the generally favorable progress of business. In fact, it is believed that the outlook for the future justifies a remarkable degree of optimism on the part of trade and industry. The domestic market is very large, production and consumption are on a satisfactory scale, and the foreign situation is definitely improving. In fact, no country in the world is so soundly buttressed financially and economically as the United States today."

The election of officers resulted as follows:

President, J. L. Fearing, International Paper Company, New York. Vice-president, New England District, Walter E. Perry, Chemical Paper Manufacturing Company, Holyoke, Mass.; New York District, F. N. Countiss, Martin Cantine Company, New York; Chicago District, J. Ray Russell, Marathon Paper Mills Company, Chicago; Miami Valley District, R. T. Houk, Jr., Dayton, Ohio; Secretary-treasurer, Warren B. Bullock, New York.

WRITING PAPER MANUFACTURERS

Routine business and the election of officers occupied the attention of the Writing Paper Manufacturers' Association at their annual meeting held at the Waldorf-Astoria on Wednesday morning. The following officers and executive committee were elected:

President—Philip Weston, Byron Weston Company, Dalton, Mass.

First Vice-president—W. M. Crane, Jr., Crane & Co., Inc., Dalton, Mass.

Second Vice-president—Chairman Sulphite Bond Division, A. H. Nevius, the Miami Paper Company, West Carrollton, Ohio.

Secretary-Treasurer—E. H. Naylor.

Executive Committee—Chairman, Philip Weston, Byron Weston Company, Dalton, Mass.; W. N. Crane, Jr., Crane & Co., Inc., Dalton, Mass.; A. H. Nevius, the Miami Paper Co., West Carrollton, Ohio; D. K. Brown, Neenah Paper Company, Neenah, Wis.; A. H. Dwight, Hawthorne Paper Company, Kalamazoo, Mich.; E. A. Oberweicer, Whiting-Plover Paper Company, Stevens Point, Wis.; A. R. Smith, Keith Paper Company, Turners Falls, Mass.

Member of Advisory Council of American Paper and Pulp Association, Philip Weston, Byron Weston Company, Dalton, Mass.

COVER PAPER MANUFACTURERS

The following officers and Executive Committee were elected at the annual meeting of the Cover Paper Manufacturers Association held on Wednesday: president, D. L. Quirk, Jr., Peninsular Paper Company, Ypsilanti, Mich.; vice-president, B. A. Franklin, Strathmore Paper Company, Mittineague, Mass.; secretary-treasurer, E. H. Naylor, 18 East 41st street, New York, N. Y.; Executive Committee: Chairman, D. L. Quirk, Ja., Peninsular Paper Company, Ypsilanti, Mich.; B. A .Franklin, Strathmore Paper Company, Mittineague, Mass.; Minor M. Beckett, the Beckett Paper Company, Hamilton, Ohio; member of Advisory Committee of A. P. & P. A., D. L. Quirk, Jr., Peninsular Paper Company, Ysilanti, Mich.

SPECIALTY MEN ORGANIZE

At a meeting of paper specialty manufacturers held in Room 151 on Tuesday afternoon, the Paper Specialty Manufacturers' Association was formed, the following officers being elected to preside over its destinies during the first year of its existence:

President, W. R. Lenderking of the Purity Paper Vessel Company; vice-president, Emil Hansen of the Fort Howard Paper Company; vice-president, Carl Becker of the Westfield River Paper Company; secretary and treasurer, J. E. Willert, of New York.

Many of those in attendance spoke with enthusiasm of the good that could be accomplished by such an organization and the final action on organization was unanimous.

TISSUE MANUFACTURERS ASSOCIATION

The meeting of the Tissue Paper Manufacturers' Association was held Tuesday morning. The attendance was unusually large and unusual interest marked the proceedings. Various matters of trade interest were discussed. The following officers were elected:

President, F. W. Hoefler of the Oswego River Paper Mills, Phoenix, N. Y.

Vice-Presidents, J. B. Rieg of the Erving Paper Mills, Erving, Mass., and H. W. Brightman of the Northern Paper Mills, Green Bay, Wis.

Secretary and Treasurer, Emmett Hay Naylor.

CARDBOARD ASSOCIATION

The Cardboard and Glazed and Fancy Manufacturers Associations, whose secretarial and general association work has been handled by the American Paper and Pulp Association since the retirement of Jacob Erichson to enter the pulp industry, decided at its meetings at the Waldorf-Astoria on Wednesday to continue their present policy and work through the big organization. The Gummed Paper Manufacturers, the third association under Mr. Erichson, did not decide just what its future policy would be, but is considering a slightly different form of association activity.

SIMPLIFICATION COMMITTEE

The meeting of the Simplification Committee, held Tuesday morning at the Waldorf Astoria, was attended by a representative gathering of manufacturers, distributors and consumers. Various speakers favored getting behind the simplification program which has as one of its main features the adoption of eight basic sizes. The meeting unanimously endorsed the simplified practice recommendation as embodied in the action made at a general conference of representatives of manufacturers and users of paper which met at the

Electrifying the

The superiority of electric drive over steam drive for paper mill operation is a fact generally acknowledged. The older plants which have changed over completely, have soon paid for the installation by the increased profits that motor drive affords.

For new mills, electric drive affords even greater possibilities, because the requirements and the best functioning of paper making processes entirely govern the selection and arrangement of equipment.

Whether for laying out complete electrical equipment for a new mill, or for calculating the most profitable drive for an old one, Westinghouse Electric and Manufacturing Company has been of marked assistance to pulp and paper manufacturers. This company has advocated from the very beginning the use of electric drive for paper mill operation. It has studied the power and speed requirements of every machine, to determine just what type of motor should

Two Vertical Westinghouse Water Wheel Generators 3330 Kva. 300 rpm.

Westinghouse

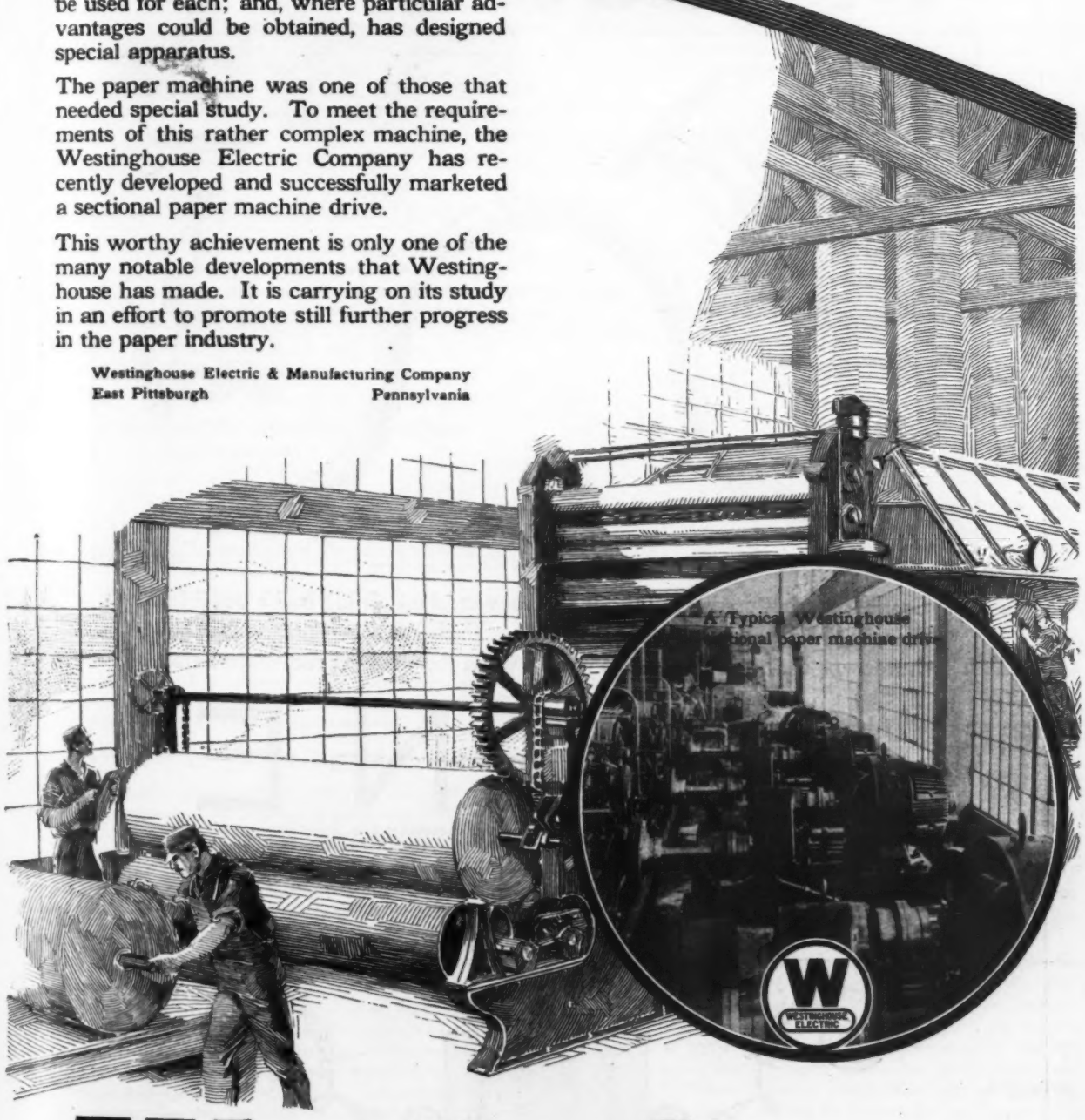
Paper Industry

be used for each; and, where particular advantages could be obtained, has designed special apparatus.

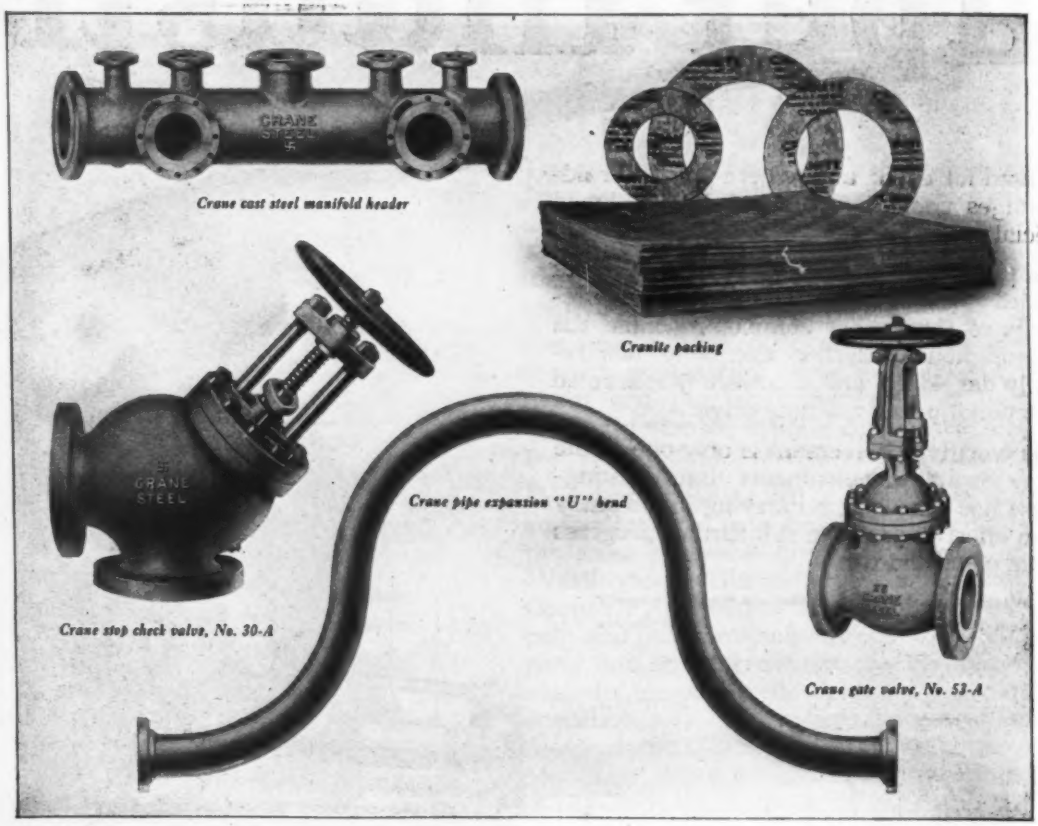
The paper machine was one of those that needed special study. To meet the requirements of this rather complex machine, the Westinghouse Electric Company has recently developed and successfully marketed a sectional paper machine drive.

This worthy achievement is only one of the many notable developments that Westinghouse has made. It is carrying on its study in an effort to promote still further progress in the paper industry.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania



Westinghouse


Crane cast steel manifold header
Cranite packing
Crane stop check valve, No. 30-A
Crane pipe expansion "U" bend
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Crane materials used throughout your power plant piping make possible a thoroughly dependable system. Freedom from leaks and the costly plant shutdowns that might result is your reward for their correct installation.

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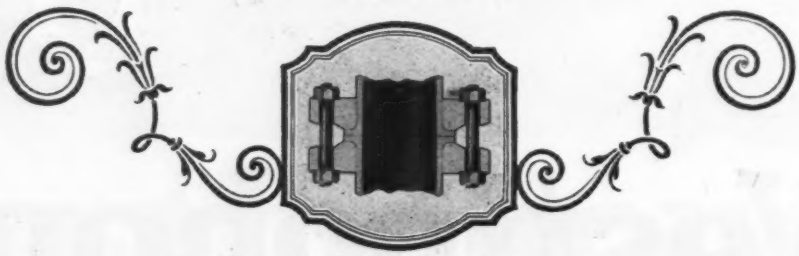


Crane lap joint with square corners

Bureau of Standards in Washington on June 19, 1923. The stock sizes which are approved by Tuesday's meeting are:

General printing and publishing—26 x 29 inches; 29 x 52 inches; 25 x 38 inches; 38 x 50 inches; 32 x 44 inches; 44 x 64 inches; 35 x 45½ inches.

Book publishers—30½ x 41 inches; 41 x 61 inches.

Forms and letterheads—17 x 22 inches; 22 x 34 inches; 17 x 28 inches; 28 x 34 inches; 19 x 24 inches; 24 x 38 inches.

OFFICIAL VISIT TO PAPER SHOW

Members of the American Paper and Pulp Association devoted Thursday afternoon to an official visit to the second Paper Industries Exposition, now in progress at the Grand Central Palace. It had been so busy a week for many of the members that a considerable number of them had not found time up to Thursday to pay the show a visit. The visit to the exposition brought forth general commendation of the show as one complete and thoroughly representative of the paper industry.

CONVERTING PAPER ASSOCIATION

Discussion of the foreign import situation as it relates to the book paper mills, particularly those of the Middle West, was the chief feature of the discussion of the Converting Paper Mills Association luncheon at the Waldorf-Astoria on Tuesday. About twenty members attended. It was also decided to have its work conducted by the American Paper and Pulp Association. This is a departure from its usual custom for the past two years. It started as an independent organization.

PRESIDENT'S ANNUAL LUNCHEON

The president's annual complimentary luncheon in honor of the past presidents of the American Paper and Pulp Association was attended at one o'clock Thursday afternoon, directly following the general session of the association. The luncheon was in Room 115. There were forty in attendance, and the number included all the past presidents with the exception of W. N. Caldwell and Mr. Rogers. The gathering was a most agreeable one.

PAPER MAKERS' ADVERTISING CLUB

The Paper Makers' Advertising Club held a luncheon and a discussion at the Waldorf, Wednesday noon. There were about fifteen or twenty members present, who talked over the advertising policies and the principal lines of their several companies.

WATERPROOF PAPER MANUFACTURERS

The Waterproof Wrapping Paper Manufacturers held a meeting Wednesday afternoon at the Waldorf at which they talked over general business problems and discussed association policies.

CONFERENCE OF TISSUE MEN

On Monday afternoon the tissue paper manufacturers and merchants held a conference such as it is planned to hold regularly hereafter. There were about twenty in attendance. There was interesting discussion on the further use of label guarantees for sheet tissue, standardization of sizes, etc. Treasurer, A. J. Corning, of the National Paper Trade Association presided.

WAXED PAPER MANUFACTURERS

The Waxed Paper Manufacturers discussed several trade issues at their scheduled meeting Tuesday morning and adjourned until Wednesday for the purpose of organization. At the second day's conference they formally organized as an association, which will have nearly 80 per cent of the tonnage of that group of the industry. The new association decided to affiliate with the American Paper and Pulp Association.

WRITING ASSOCIATIONS MEET

Wednesday afternoon the three divisions of the Writing Associations held their meetings. The Fine Paper Division met in Room 114; the Sulphite Bond Division in the East Room, and the Middle Grade Division in Room 141. Organization for the ensuing year was perfected by the three divisions and issues concerning the various branches were debated.

UNITED STATES PULP PRODUCERS

The United States Pulp Producers' Association held its meeting Tuesday noon, following luncheon in Room 112 at the Waldorf-Astoria. The meeting was exceptionally well attended and at its close it was announced that the association had considered various matters of general interest to the trade. The meeting voted to continue its present officers in office another year.

WRAPPING PAPER MANUFACTURERS

The Wrapping Paper Manufacturers' Association met on Wednesday morning in the Tea Lounge of the Waldorf-Astoria and discussed the general condition of their business, both as to the domestic and foreign problems. The meeting was well attended and the discussion interesting, although no definite action was taken.

BRISTOL BOARD MANUFACTURERS

A meeting of the Bristol Board Manufacturers' Association was held in Room 114, Wednesday forenoon, when matters of general trade concern were discussed and routine business transacted. The annual election of the association does not come at this time.

DUTY OF 25 PER CENT ON MILL WRAPPING

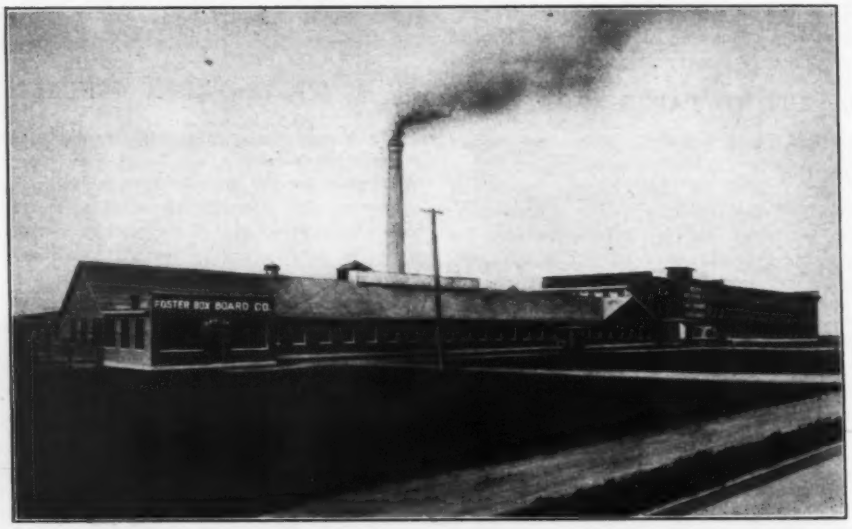
The Treasury Department at Washington has held that a duty of 25 per cent shall be assessed on mill wrapping paper in rolls. In a letter to the Collector of Customs at Detroit, in this connection, Assistant Secretary of the Treasury Moss said:

"The Department is in receipt of a letter from your Deputy Collector at Saulte Ste. Marie, Mich., in regards to a variance in practice between his port and the Appraiser of Merchandise in New York in the classification of certain paper described by your Deputy Collector as mill wrapping paper in rolls. Your Deputy states that there is no question that the paper covered by the entry referred to in his letter is used for the wrapping of news print paper and that it was entered as wrapping paper at the rate of 30 ad valorem.

"In this regard I have to advise you that the sample submitted was examined by certain domestic manufacturers of similar merchandise and all of them stated that it was made on a board machine and not on a paper machine.

"In the opinion of the Department the question as to whether the merchandise represented by the sample should be classified as board or paper is to be determined by the domestic manufacturers of this merchandise. And all of them stated that it was made by the process of manufacture and not the composition of materials, used in this manufacture. And as the domestic manufacturers state that sample is representative of merchandise made on board machine and not on paper machine the Department approves the practice of New York in advisorily returning the merchandise under paragraph 1302 or subject to countervailing duty of 25 per cent ad valorem under T. D. 39364.

Established 1905



MANUFACTURERS OF

HIGH GRADE PAPER BOX BOARDS

NEWS BOARD
JUTE BOARD
CHIP BOARD

FOLDING BOX BOARDS
COLORED SPECIALTIES

BOTTLE CAP BOARD
SOLID MANILA BOARD
SULPHITE BOARD

Our EXPERIENCE gained in 20 years of manufacturing—coupled with an INTERESTED study of our customers' requirements—help us to SATISFY—those consumers of Paper Box Boards—who are EXACTING in their requirements and who desire a MILL CONNECTION to serve them as a department of their business—with HONESTY OF PURPOSE and UNIFORMITY OF QUALITY.

We invite inquiries.

Foster Box Board Company

ERIE & WHITESBORO STS.

UTICA, N. Y.

Paper Merchants in Convention

National Paper Trade Association of the United States Holds Annual Meeting at the Waldorf-Astoria Hotel, New York

Twenty-First Annual Meeting of the Organization Is Well Attended By General Paper Dealers from All Over the Country—F. W. McQuillen, President of A. Storrs, Bement Co., Boston, Mass., Is Chosen to Head the Association for the Ensuing Year—Conditions in the Trade Are Interestingly Discussed by Representative Members—Speeches by Representative Men on Timely Subjects.

The meeting of the Wrapping Division of the National Paper Trade Association was called to order at the Waldorf-Astoria, New York at 2:30 o'clock Tuesday afternoon, April 8, by James A. Carpenter, vice president and chairman of the division.

Remarks by the Chairman

THE CHAIRMAN: First I want to congratulate all of you and say that after the cartoon in Mr. Howard's paper the other day you might think that the wrapping paper merchants would not be able to get here, but I want to say that the wrapping paper business looks just about as good as any other paper business, possibly a little better, and I am sure some of the representatives here are very much better off than they were last fall. We haven't any of us gone out of business, and I think that we, in close touch with the bag situation, are convinced that it is considerably better than it was. While it is not all we would like to have it, it is very much better than it was.

W. F. McQUILLEN, Pres.

Practically everybody's sales are very close to last year's, and some a little better.

I have talked with a good many fine paper men since I have been here. I suppose that their situation is no different than ours. We are here boosting the wrapping paper business. Practically every farmer is making a living, and conditions are not nearly as bad as they thought they were; and I think conditions are very much better today in the wrapping paper business than we thought last fall, so I am sure we haven't got very much to worry about.

The proposition, as I see it, is to give good merchandise, efficient service at a reasonable price. I believe the prospect is as bright for us as for any line that I know anything about.

The first thing is the report from our Statistician, Mr. Leslie M. Pape.

Statistician's Report

MR. PAPE: Before referring to the charts which you have before you, I would like to give a few statistics which have a bearing on the present situation in wrapping and tissue papers. Statistics are sometimes boring, I know, and yet they are frequently very useful, provided they are properly interpreted. For example, you may have read the other day of the umbrella dealer who had always followed the practice of laying in a year's supply, until he chanced across a diagram showing the amount of rainfall per month throughout the year. He then adopted the policy of so arranging his purchases that delivery was made to him monthly in proportion to the amount of rainfall. Not only did he not have his money tied up in a year's supply, but he found that, due to his being given thirty days for payment, he did not have to use any of his money at all.

The general situation for the past year as shown by our charts, is, of course, well understood by those who participate in the association's statistical activities. Following a decline in orders in November and December, 1922, there was a large increase in orders in January, 1923. This buying held up through February and March and then fell off rapidly, reaching its low about July. Buying continued at about the July rate until January and February, 1924, when again there was a substantial increase, and orders exceeded production for the first time since March, 1923. Shipments by merchants fell off about May or June of 1923, but showed a seasonal recovery in the fall. Stock in the hands of manufacturers were considerably higher at the end of 1923 than at the end of 1922 and a little higher in the case of the merchants.

Production of Wrapping

Production of wrapping and bag paper and of tissue paper was estimated by the American Paper & Pulp Association at 1,003,000 and 182,000 tons respectively, representing a slight decrease from 1922 and an increase of about 15 per cent over 1919, a year which compares favorably with 1923 for general business activity. It is felt, however, that the estimate for 1923 for wrapping and bag paper was too low and my own estimate is that production was at least equal to the 1922 production of 1,048,000 tons. This would appear to be confirmed by the fact that, although production was at a high rate in 1922, it is doubtful whether consumption was at a rate higher, if as high, in 1922 than in 1923; yet stocks were not built up in 1922 as in 1923, this indicating a larger production for 1923.

It is estimated that production of all grades of paper in 1923 was equal to 16 per cent of the machine capacity for that year. This compares with 86 per cent in 1920 and 62 per cent in 1921. In the four years 1920 to 1924 machine capacity increased 29 per cent whereas production increased 16 per cent. In wrapping and bag papers capacity increase 26 per cent against an increase in production (on the basis of the lower estimate), of 15 per cent.

TRINITY BAG & PAPER CO. INC.
23-25 WEST 43rd STREET
NEW YORK, N.Y.

Tissue paper capacity increase 66 per cent against an increased production of 17 per cent.

There is some question as to accuracy of import statistics, but imports of wrapping paper during 1923 appear to have been about 45,610 tons representing an increase over 1922 of about 11,000 tons. The 45,610 tons is only about 4½ per cent of the total production during 1923, and is moreover partly offset by exports of some 14,000 tons.

On the other hand, since the greater portion of the imported paper is marketed in a restricted territory, it undoubtedly has had a greater effect than the figure of 4½ per cent would seem to imply.

Now, the problem I would raise is this: In view of the fact that orders received start the ball rolling, is it possible to record statistically the factors, whatever they may be, that cause orders to rise or fall? It was with this problem in mind that I charted the two indexes of consumption, namely, merchants' shipments and printers' productive hours. It will be noted however, that they show a close relationship to general business, and are not, to any visible degree, a factor affecting orders. Possibly if we had an accurate index of sales by merchants we should find that it moved along with or ahead of orders, but I doubt it. I am inclined to believe that buying by the merchant is for the most part buying in anticipation and that evidence is here given in confirmation of that theory of the business cycle which makes the middleman or jobber the prime motivator within the cycle.

No change is contemplated in the statistical plan now in effect. It is believed to be wholly satisfactory and it will be our aim to put it across in the best way possible.

Assistant Secretary's Report

THE CHAIRMAN: The next is our Assistant Secretary's report, Mr. Higgins.

MR. C. K. HIGGINS: The first thing I want to mention is the first thing I always mention to this meeting, and while it may bore you, I won't take long: it is the matter of our Collection Department.

This year we have done more business in that direction and I am, I think justifiably, proud of our record. I would like to read a list of the associations which are using this service and the amounts we collected from March 1, 1923, to February 29, 1924, as contrasted with the period March 1, 1922, to February 28, 1923. I might say that in every case, except in the New England Association, we have shown a marked increase, and in the case of that association there were two accounts where one individual member totalled $5,000 though, in the period March 1, 1922, to February 28, 1923, and this year we didn't have any account of that size, so the amount is less in that one case. I will read the associations and the amounts collected.

Associations	Amount collected from March 1, 1923, to February 29, 1924	Number of Members	Amount collected from March 1, 1922, to February 28, 1923
Baltimore & Southern	$300.98	2	
Missouri Valley	735.16	2	$1,168.92
New England	1,950.85	4	8,281.99
Northwestern	4,400.98	5	1,820.00
Wisconsin	533.44	4	214.17
Philadelphia	639.90	4	161.21
Western	1,057.87	1	72.85
Empire	2,522.86	8	141.44
Southern	2,836.03	3	1,717.24
Middle States	23,502.89	22	16,607.01
Totals	$39,480.86	55	$30,185.44

The total for this year is $39,480.86, as against $30,185.44. That is an increase of 30.8 per cent.

There are 55 members who are using this service, and this makes an average collection for those members of $717.83 each, which certainly pays their dues two or three times over. There are only two associations now that are not using our service; one is the Central States, a Fine Paper organization and the other is the Pacific States Association, which probably thinks they are too far away for us to be able to help them. We now have over three hundred live accounts in our office in Chicago, and I hope that any members who are not using this will just give us a trial, because it doesn't cost you a thing, and if you will send us $1,000 worth of accounts we will pay back your dues three or four times over.

I won't go over the details of the collections for the month of March, but I will say that during that month we have collected $4,406.01. $3,131.76 of that was for Middle States Association and $1,273.25 was for various members of different associations.

Now, I would recommend that service to you, because it has been successful for others, and there is no reason to believe it should not be successful for you. All you have to do is to send your accounts and we will do the rest.

Various Activities

In this report of mine I am going to try and touch as briefly as possible, and yet give you the important details of various activities which have occurred so far in the committee meetings, conferences, dinners, and so forth.

It is a feeling of our executive committee that if it were possible it would be very advantageous to have all our members there in these committee meetings and these conferences and dinners, but manifestly it is impossible because of the nature of committee work. Many of our members often say, What does the National Association do for us? If you could sit in on these committee meetings and if you had been at the conference dinner last night, you would appreciate exactly what we are doing for you.

I want to take up some of the things we have discussed at the first meeting we had with manufacturers of tissue paper. There have been reports that have come to me of various evils and practices which were very much to the detriment of the tissue paper industry. I have here a typewritten sheet of the various topics that were discussed at this meeting yesterday afternoon. Mr. E. H. Naylor presided.

The first thing we discussed was grades and sizes; there are too many grades of so-called No. 1 tissue today, with a vast range of values. Can we not define a No. 1 grade and ask the mills to adhere to these specifications? This was the first topic discussed yesterday.

We next came to undesirable sizes.

The next topic was running under weight. We have a number of instances reported to us of tissue that was marked 10 pounds, which was actually 9 pounds. That is a difference of 10 per cent under weight and we feel that no mill could do that accidentally. That is too large a percentage under weight, and we felt that if paper was run that way, it was probably not accidentally; and we realize that perhaps some of the merchants are equally to blame with the manufacturer, but we are trying very hard to correct it and do away with this practice.

The next thing we talked about was misnaming of Kraft tissue. We refer to samples which were part sulphate and part sulphite called Kraft tissue, but clearly it was not Kraft tissue.

The next topic discussed was napkins. Sizes varying from 12 by 12 to 18 by 18, inclusive, original size being 14 by 14. We included in the standard sizes the 13½ by 13½.

We also strongly recommended that each bundle be stencilled at the mill showing exactly what was in it, and the same be stencilled on any carton, where they are used.

Also in the committee we discussed the subject of over-production in tissues. It doesn't take very much discussion when there is such an evident over-production; we simply have to admit it.

H. I. PRANKARD, President GEORGE F. WHITEHEAD, Treas.

MOHAWK PAPER MAKERS, INC.

Mills:

COHOES, N. Y. **WATERFORD, N. Y.**

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SERVICE

Our conception of service is the keynote of our organization.

It means the maintenance of two mills with three machines in perfect condition.

It means a happy, carefully trained personnel who, given perfect materials turn out splendid papers to meet the requirements of our trade.

We make paper to order in White, Black or Colors, in practically any desired weight or grade.

If a close working arrangement with our two mill organization will be of value to you, as we know it will, we solicit your inquiries.

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Another thing that was recommended was that we go back to the practice, which has evidently been abandoned of using the Tissue Association labels, which guarantees the count et cetera.

I think that is all I have to report about that particular meeting.

Membership in Local Associations

In the executive committee this morning we took up the matter of membership in our local association purely as a matter of interest, and I think I can truthfully say that our wrapping paper membership is now at the peak. In one or two instances we are slightly below the membership which has been reached in some former years, but in most cases we have now the largest enrollment in these local associations to date.

We took up in the Executive Committee the things in which the National Association has assisted to prevent certain changes in freight rates in connection with crepe napkins and towels. This is another phase of the situation which we would like to give some publicity to. This is a very definite, tangible thing which we have accomplished. We assisted in preventig a change in rates which would have increased the cost to the consumer.

Our Executive Committee this morning discussed several topics. One of those was the topic of simplification and the evil of carrying a multiplicity of lines, and I want to quote what was said by a representative of a very well known merchant. He was speaking of wrapping papers only and he stated in substance before the Executive Committee that originally they had carried some 62 lines in wrapping paper; that they had now reduced those lines to 14, and in reducing those items to 14 had increased tonnage. Think that over! He also stated that carload direct business was carried on in their particular organization on an 8 per cent basis, which is also something to think over.

Opinion was expressed at this meeting that when you sell paper you should not neglect to sell the service that goes with it; that the service the paper will render should be emphasized and that instead of having order takers you should have real salesmen, salesmen who instil in the minds of the buyers the service that the paper will do, and the reasons why that buyer should buy that particular sheet from that particular house.

Mr. Robert Johnson, Jr.: Mr. Higgins, I am not quite clear on that statement that you made about stocks being low now. Is that a matter of fact or is that just matter of opinion?

Mr. Higgins: The statement has been made to us, and I daresay it is a matter of fact. It is the stated opinion of a great many of our people, that such is the case. It is the opinion of a great many manufacturers.

Mr. F. L. McClellan: Mr. Chairman, the stocks are very good, even above normal if anything. I certainly think they are full up to normal; I should call a sixty day stock normal. We carry a minimum of thirty, a maximum of sixty, but as a rule we are over sixty now.

Mr. Schoenbucker's Report

The Chairman: We will have the report of Mr. Schoenbucker.

Mr. N. A. Schoenbucker: Nothing has given me greater encouragement and gratification since I have been engaged in this Association work than the developments which have occurred in the Wrapping Paper Division during the past year. I do not infer that this feeling arises from personal accomplishment. What I mean is that:

First: It has been a pleasure to witness the constructive changes which have been affected by individual merchants as a result greater detailed study of their businesses arising from Association educational work, and

Second: It has been an even greater pleasure and really interesting to see how many Wrapping Paper Merchants have gone about the job of self improvement in net profit regardless of competitive conditions.

We must observe from past experience and also a few recent experiences which I have noticed that any such constructive reform or movement starts with the leadership of one or two who determine to distribute their merchandise on their own cost plus a fair profit, paying little or no attention to competition. Strangely enough I have seen at least half a dozen different demonstrations of the fact that such pioneers do not suffer even temporary loss in net results even though volume may suffer. Gradually others adopt the practice in a given market until only a few remain who base their mode of conduct on the expediences of competition rather than on operating facts. But in view of the fact that these remaining few have always operated similarly, the result is that the whole market is improved but on a more satisfactory level to all.

The behavior of the market in the calendar year 1923 spoiled what would otherwise have been a very satisfactory year for some from the standpoint of net profit. Many did, however, show satisfactory net profits, all things considered, despite the unfavorable reaction of the market.

This again brings home the fact that a break in the market of ten per cent, wipes out from three to five months of net profits on warehouse business. While merchandising margins are steadily approaching somewhere near the ideal, on warehouse sales, for the "average" merchant, such margins are by no means adequate to withstand even a slight shock from market losses.

Department stores universally follow the custom of adding into the regular mark-ups a percentage based upon past experience to cover sales, mark-downs, close-outs, etc. There is no reason why Wrapping Paper Merchants should not provide a similar reserve for market losses in their individual mark-ups. This could be done by adding, a given percentage of the mill invoice cost along with freight and difference in discount, and then starting the mark-up from the total of these.

From a merchandising margin and also from a market standpoint, it would seem as if the first six months of 1924, namely the period we are now in, should be an excellent barometer for every Wrapping Paper Merchant to gauge the effectiveness of his management and policies.

Let each wrapping paper merchant, therefore give special consideration and study to this period to the end that in the summer months, a review will be made by each individual merchant of the first six months of the year so that all necessary remedies will be adopted with a view of making 1924 the best year the Wrapping Paper Division has known in point of merchandising margins,—I exclude market gains or losses. This is by no stretch of the imagination a prediction. It is rather a hope, based upon the belief that every condition, both as to business conditions and as to personal relationships, in competition, seems to indicate that such hope is grounded on *fertile possibilities.*

D. Clark Everest Speaks

D. Clark Everest: I have just been discussing the import pulp situation, and I don't know whether I am in the mood to discuss the wrapping paper situation.

When your Secretary asked me to speak to you regarding the wrapping paper situation I endeavored to persuade him that we should secure someone who was a producer of wrapping papers in quantity rather than a producer of wrapping papers of quality, but inasmuch as he was unable to find anyone else who would consent to try and tell you gentlemen about a subject with which you are possibly much more conversant than anyone else, it was finally agreed that I would endeavor to give my impression of the situation for what it may be worth.

On my arrival here yesterday morning the first thing I was confronted with at the hotel was a publication put out by one of the best fellows in the paper trade publication line, but whom I do not believe had a correct view of the wrapping paper situation as it exists today. I refer to the cartoon published in the *American Paper Merchant,* which represented "Fine Paper" as a man wreathed in smiles, puffing a large black cigar placed at an Uncle

ORR
FELTS
& JACKETS
A Remarkable range of grades
Textures and weights
Orr Endless Felts can now be obtained up to 86 feet in length.
With our enlarged new equipment we can now furnish Paper Manufacturers with endless felts up to 86 feet in length.
Paper Manufacturers who carefully check manufacturing costs, and also strive to produce more and better paper at a lower cost per ton, prefer the unvarying quality and long service of ORR felts. A trial of them will bring about a preference that will be lasting.
The ORR FELT & BLANKET CO.
PIQUA, OHIO

Joe Cannon angle, entering the annual convention of Paper Trade at the Waldorf, and dragging in with him a most bedraggled looking individual with tears dripping down his face, limping along with a crutch, and this fellow was labeled "Wrapping Paper." While we admit that the cartoonist had reason to show the fine paper industry as a healthy and smiling individual, there was no reason to characterize the wrapping paper industry as being weak, downhearted or hopping on one leg. In my opinion the thought suggested to the artist should have been one of equal stability in both industries, entering the convention meeting place with an expression of confidence and pleasure.

Whether such cartoons influence business men or not I am at a loss to say, but certainly if they do not reflect true conditions they do not help the situation any, and that is why at the outset I take occasion to call attenion to this cartoon and to say that in my opinion it does not illustrate the present day situation, and if anyone has that idea I shall endeavor to show why it is based on a false premise.

The Immediate Conditions

What are the conditions in the wrapping paper business today? Let us take the immediate conditions. What are the features most prominently discussed whenever the subject is brought up? Probably volume of business is the first mentioned, and in this connection it may be interesting to note that the tonnage of orders placed for the week ending March 31st was about 30 per cent more than for the week ending March 14th and is higher than the average rate of consumption for the cycle of business running from March, 1922, to July, 1923. The volume of business in 1923 increased about 10 per cent to 12 per cent over 1922 and orders for the last week of March were in excess of that figure. And it seems to me that such an increase in March is rather unusual, unless there be a demand, particularly since we have all thought that buying was usually withheld until after the annual convention here. Apparently this has had no effect this year. Of course, the amount of orders placed in any one week has little to do with the year's business except as an indication of the immediate surface conditions, but there are some very important factors which should be considered when deciding what the business is going to be in the future. I think one of the most important features is that labor is well employed and at good wages and that the farmer is in a whole lot better situation than he would have the general public believe and the fact that both the wage earners and farmers are buying is evidenced by the fact that the carloadings of all commodities for the first three months of this year are far in excess of the same period for any other year, not excepting 1920.

Increase in Carloadings

Take out coal and coke carloadings, which have been unusually light, due to large stocks in the hands of the consumers, moderate weather conditions, and to possibility of lower prices in view of these two conditions, and we find an enormous increase in carloadings of other commodities. Take carloadings of merchandise in full cars and combined less than carload lots, and we find the first two weeks in March running on an average of 572,000 cars against an average for the same period of 1920 of 483,000 cars, and the whole record for each week in 1924, so far, has exceeded the same week in 1920 with the exception of two weeks. What is to become of this merchandise? Does it mean anything to you as merchants furnishing the paper with which most of it must be wrapped before reaching the ultimate consumer? Never in the history of this country have carloadings of merchandise ran as high during the first three months of the year. Never has advertising reached the volume which is being placed today. The financial factor is in excellent shape. For legitimate needs, money is plentiful and cheap. Stocks in the hands of the merchants and of their customers are low, except perhaps in rare instances. Every fundamental factor in the business structure points to good business, with one exception, and that is the political situation in Washington and the trouble there is purely mental and not fundamental. Since 1914 the people of the United States have become so used to newspaper headlines playing up wars, and peace missions, explosions and murders, investigations and resignations, that today these things have but little effect on business conditions. We adjust ourselves readily to new conditions and move onward. When we do get a temporary slowing up it only lasts but a short time and business comes back again with renewed vigor. Of the things at Washington I believe that the adoption of the reduction in taxation plan or the passage of the bonus bill will result in far more business activity than all the other factors can counteract.

Overproduction

Perhaps the second thing to be considered is this much talked of overproduction which in my opinion is very much over-stated. It seems to be an easy matter to talk of six or eight new machines with a production of fifty to sixty tons each coming into the market every year, but I find that most of these do not materialize. You take the statistics of the industry over a period of time and will find that the productive capacity is made to pretty well fit the demand. The limitation of the mills to store stock, if for no other reason, will control this matter of overproduction. Analyze the stocks on hand in the mills today, deducting from these the amount necessary to have on hand, of orders in course of manufacture, partially assembled cars, and so forth, and you have about three weeks' supply for the country. Suppose there was only three weeks' supply of some other commodities you may think of in the hands of the manufacturers and there would be a great commotion, but such a situation in the wrapping paper industry disturbs no one. For the benefit of all of us it would be much better to refer to the situation as being a period of under-consumption, rather than over-production, because there are times when the productive capacity does not equal the demand and this condition has existed and will exist again, when for several months at a time the productive capacity will not equal demand. I do not believe that it is correctly stated when we say that there is a great excess of productive capacity. If there was at all times an excess in capacity beyond our demand as there is in some branches of the paper industry, then we might be alarmed, but we only talk about the overproduction of wrapping paper during the period of liquidation of stocks in the hands of merchants and consumers. These periods of liquidation are usually only one-fourth to one-third of the whole time, so is it not a matter of under-consumption as against the average demand?

Another thing I would like to bring out is this: Have you ever known the producing end or productive capacity of any industry to exactly meet the demand? If we had had productive capacity for a March demand we would have been away under productive capacity to take care of January business. There is an increase in use of wrapper paper and mills are built to meet the demand, sometimes perhaps there are too many, but the situation soon rights itself and it seems to me to be better to have a little excess in productive capacity for short periods of liquidation than to have the evil effect of periods of inflation which might result from inability of mills to furnish anywhere near the demand over a long period of buying movement.

Potential Production Capacity

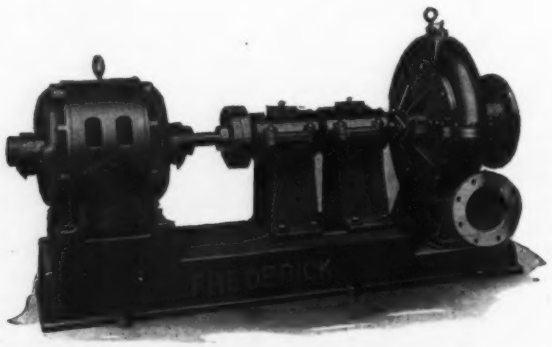
When you speak of things being in bad shape due to over-productive capacity, I am wondering if you ever consider the amount of "over-productive capacity" in your own end of the business. There is not a merchant here but who could buy and store twice as much paper as he is doing today and when buying movements start many merchants do exercise that power which only aggravates the situation. Then, too, in analyzing the volume of business done, do you take into consideration the constantly increasing number of paper dealers of one kind and another in

LOWER OPERATING COST

is within the control of the manufacturer. Selling prices are governed by many factors beyond the control of the producer.

Did you ever stop to figure how much you could increase your profits by saving even a small percentage of your pumping costs?

In "Super-Stockpumps" heavy pulp can be handled against low or high heads with greatly reduced horse power and no clogging.



"Super-Stockpumps" are not ordinary pulp pumps. They will pump stock up to 70% consistency and will show better efficiency and require less power than any other pulp pump made.

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They will save the cost of the change in less than one year.

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your own locality, and the fact that each one gets some of the business you had before? Potential "productive capacity" in the distribution end of the wrapping paper business looks to me to be far in excess of the "productive capacity" of any other branch of the industry. One man recently said that it used to be that when a man was out of a job he started in to sell life insurance, but now he immediately starts into the distributing of wrapping paper. But even this situation is not discouraging, unless it is too greatly overdone, but I believe the demand will maintain the price and the relative profit and furthermore than proper co-operation between merchants and manufacturers in establishing mill connections will do much to eliminate the unreliable distributor who carries his office in his hat.

Importations

Coupled with the matter of production is that of importations. This to me seems to be most serious and the most disturbing factor we have. Comparatively only a small quantity is brought in; I think it runs about 4,500 tons per month, but the prices at which it is sold help to fix the price on the entire domestic production of 75,000 tons per month, particularly in a period of liquidation or slow buying. It seems ridiculous that so small a quantity should have an effect, but it does, and in the long run it hurts the merchant just as much as it does the manufacturer.

With the variety of good papers made in this country today there is no necessity to buy wrapping papers abroad and particularly from mills which are practically, if not already, bankrupt, and which are dumping product in this market without regard as to the cost. Paper bootleggers have made a business of getting in misbranded shipments but with the help we hope to get from government officials we may be able to stop some of this smuggling and improve the situation. Merchants can help in this situation by showing their loyalty to American institutions. Our neighbor to the north occasionally reminds her subjects of the slogan, "Canada for the Canadians," and I think it is about time we wake up to the idea of "United States for U. S. us."

Good Elements Outweigh Bad

In summing up the whole situation, taking into consideration the surface conditions as they show up today, the underlying conditions as they look for the future, the question of whether or not we have serious overproduction, the matter of the import situation; all of these things carefully analyzed and I believe the good elements far outweigh the bad.

I believe we have before us at least three months of good business, mills operating at actual productive capacity and shipping all they make, and probably materially reducing such stocks as they may have at the mill. I do not believe there will be any speculation and I sincerely hope not, as we much prefer a long period of activity at a uniform rate of orders placed than a short period at an excessively high rate. During July and the first half, possibly all, of August we will probably see restricted demand with a resumption of business by the middle of August or the first of September, which will go through until the holidays, and barring political accidents, I cannot see why the early part of 1925 should not continue on a satisfactory basis.

Closer co-operation between mills and merchants will help this situation greatly. Our interests are identical, and the sooner we come to realize it the better for all concerned. In he past, weak-kneed mill representatives, cold-blooded purchasers among the merchants, and Old Dame Unconfirmed Rumor have cost both merchants and manufacturers immense sums of money. These have done more to strangle good potential markets and reduce inventory values than any other factors. This condition I believe is improving and I hope that by co-operation we may bring about a desirable situation for all of us.

Personal Relationship

Establish your connections with mills on a personal relationship basis. The old idea of every purchase standing as a separate contract is out of date. Do business on a give and take plan. In the manufacture and distribution of 125 tons of paper daily for 308 days for 1923, or full hundred per cent performance and with 1924 running ahead of last year by nearly ten per cent, I am convinced that the personal friendship in business element is the one to cultivate. It has worked out in our case.

I believe that 1924 business will exceed 1923 and that at the end of the year we may look back on it as one of the most satisfactory in the wrapping paper business.

MEETING OF THE FINE PAPER DIVISION

The meeting of the Fine Paper Division, in the absence of the vice-president and chairman, Fritz Lindenmeyer, was called to order by Secretary Ridgway at 10:30 o'clock Wednesday morning, April 9, in the Waldorf-Astoria Hotel, New York. Ross P. Andrews, of Washington, was elected to preside in his place.

THE CHAIRMAN: Gentlemen, for the same reasons which occasions his absence from this meeting, we have no report from Mr. Lindenmeyr, and the next order of business will be the report of the secretary, Mr. Ridgway.

Secretary's Report

As we see it, the fine paper merchant generally is dissatisfied with his lot. His dissatisfaction is primarily caused by the fact that in 1923 he distributed a tonnage of paper nearly equal to the record year, 1920, but at a net profit which was entirely inadequate based on the column of business transacted. He realizes that price competition, which on some lines was never keener than during the past year, is largely responsible for the failure to realize adequate net profit; that this unsatisfactory price condition was due to over-production, and that with the large increase in productive capacity little improvement can be expected until demand catches up which, in all probability, will not be for some years to come. He is particularly unhappy and discontented because he knows that he has no control whatsoever over production, and that, if his net profit position is to be improved, it will have to be accomplished from within.

He knows he must in some way increase the spread between expense and income, but he doesn't seem to be sure whether this can better be accomplished by reducing expense or holding that stationary and increasing the income. He has learned from experience that mere volumn without regard to the gross margin will not produce the desired result. It is, therefore, not at all surprising that there should be decided differences of opinion as to what he should do, and it is hardly to be expected that every individual will seek relief by the same means.

Difference of Opinion Not Surprising

A considerable number feel it is possible to reduce expense and thereby obtain the desired relief, while others believe expense is incapable of sufficient reduction to meet the need, and increased mark-up is the only solution. It is entirely possible that both opinions may be correct as applying to individual businesses, for we believe that many merchants have cut expense materially, but we likewise believe that there are a considerable number who can make substantial savings in their expense items. Special delivery service, returned goods, service departments, slow moving items of stock, broken packages, etc., all cost money and add to the cost of distribution. We are not to be understood to imply that any or all of these expense factors can be eliminated, but we do believe that every possibility of expense reduction should be most thoroughly studied both by the individual and by the industry collectively to the end that the cost of distribution be reduced to the

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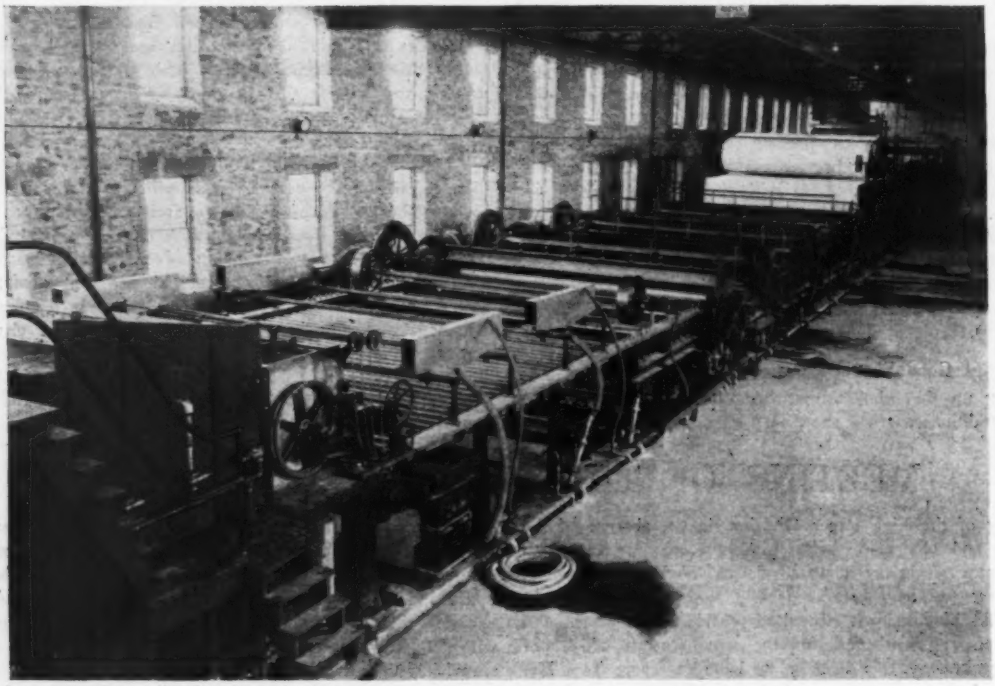
The New "Bagley" Fourdrinier Machine at Algonquin Paper Corporation



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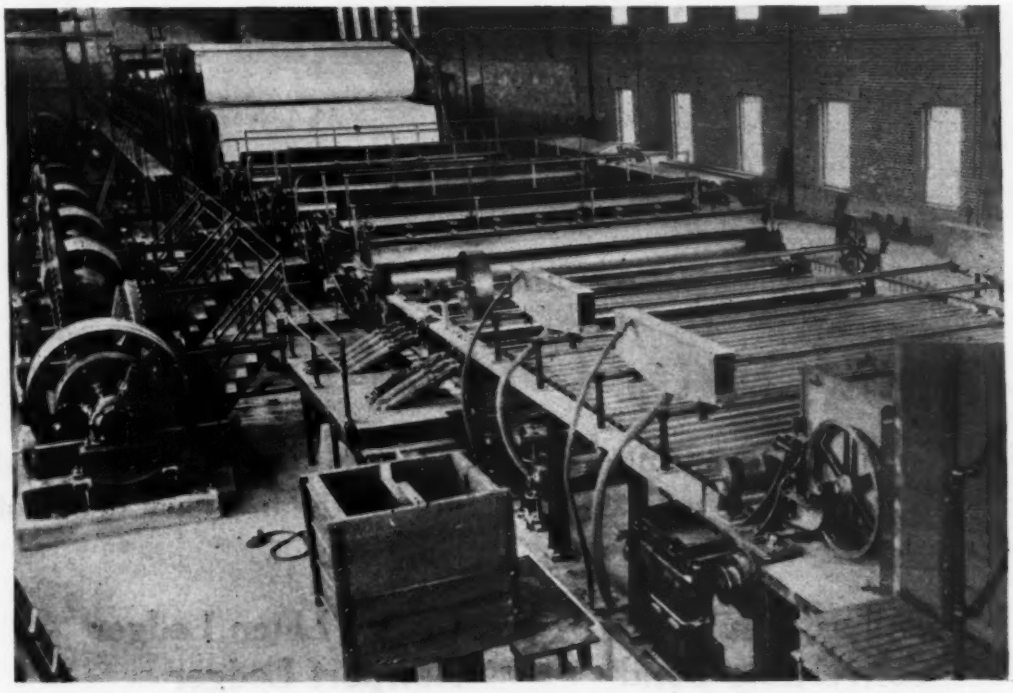

Thus the greatest quantity of News ever made by one machine in one day is obtained by a "Bagley" Machine and a "Bagley Christian Drive."

Also don't forget the first machine ever producing 1000 feet of paper per minute was a "Bagley" and driven by another "Christian" Drive.

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lowest possible point commensurate with efficient distribution. It is quite possible that the most thorough effort in this direction will not succeed in materially lowering the cost, but it will at least conclusively prove that no relief is possible from that direction and will crystallize opinion as to the necessity of adopting the other alternative as a means of keeping the business of merchandising paper in a healthy condition financially. Until this effort is made, we are of the opinion that the trade is likely to be far from the same mind as to what should be done.

Squeezing Expense From Overhead

Your Program Committee undoubtedly had this same thought in mind when they selected the topic, "How Can the Cost of Distribution Be Simplified?" to be considered in the local associations and again at this meeting. It is to be earnestly hoped that the discussion and consideration of the report of this committee will point out ways of reducing the cost, but all effort in this direction will prove utterly futile unless the individual follows through by the most determined endeavor on his part to squeeze all unnecessary and unproductive expense from his own overhead.

The paper merchant is spending large sums to promote and increase the sale of the papers he distributes, and any increased sale he may obtain over and above the normal increase in the consumption of paper is at the expense of his competitor. What we are wondering is, whether, if a considerable portion of these individual expenditures were pooled, they could not be used to better advantage for the industry as a whole. For example, if the buyer of printing could be educated to place his orders for quantities which would take full packages, the cost of breaking original packages would be reduced to a minimum and a real saving affected. Or again, if the printer could be fully informed of the cost to the merchant of "returned goods" we cannot but believe he would be far more careful in his ordering with a resultant decrease in this growing evil. Again, is it not possible that this pool could be used to grow a printing order where none grew before and thereby increase the consumption of paper and without in any way encroaching upon the function of the printer? There are undoubtedly possibilities in collective advertising which are well worth serious consideration by this Association and by its members.

We know the program of this meeting is lengthy, and we will, therefore, refrain from any further comment on present conditions.

THE CHAIRMAN: The next order of business is the report of our statistician, Mr. Leslie M. Pape.

Report by Mr. Pape

MR. PAPE: I will try to cut this as short as I can. You know, in the first place, January, February and March of last year, there was a lot of buying by the merchants, and then it fell off very rapidly; shipments by the merchants fell off about June, being at low production throughout the rest of the year. Then there was an increase in price on February 1st and March 1st. This buying fell off throughout the rest of the year away below production, with the result of a break in prices on November business. January and February of this year, for the first time, orders showed a big increase and climbed above production.

On the other hand, merchants' inventories were lower at the end of the year than they were a year ago; so this may have been largely replacement buying. Stock in the hands of manufacturers were a little higher in every case. Production of fine paper last year was about one per cent larger than the previous year, and book papers about 10 per cent higher.

Estimate Production

Production of fine and book paper was estimated by the American Paper and Pulp Association at 364,500 and 1,078,800 tons, respectively. The 1923 production of fine paper represented an increase of 1 per cent over 1922 and 6 per cent over 1919, a year which compares favorably with 1923 for general business activity. Book paper production shows a larger increase, as might be expected, being 10 per cent over 1922 and 18 per cent over 1919.

It is estimated that production of all grades of paper in 1923 was equal to 76 per cent of the machine capacity for that year. This compares with 86 per cent in 1920 and 62 per cent in 1921. In the four years 1920 to 1924 machine capacity increased 29 per cent, whereas production increased 16 per cent. In fine paper, capacity increased 11 per cent against an increase in production of 6 per cent. Book paper machine capacity increased 34 per cent against an increased production of 18 per cent.

Accuracy Questioned

There is some question as to the accuracy of import and export statistics, and there has undoubtedly been some misclassification. It would appear, however, notwithstanding the fact that imports increased in 1923, that the amount of paper imported was too small to have any considerable effect in the fine paper trade. The amount of paper imported was, moreover, but half of the amount exported.

Now, the problem I would raise is this: In view of the fact that orders received start the ball rolling, is it possible to record statistically the factors, whatever they may be, that cause orders to rise or fall? It was with this problem in mind that I charted the two indexes of consumption, merchants' shipments and printers' productive hours. It will be noted, however, that they show a close relationship to general business, and are not, to any visible degree, a factor affecting orders. Possibly if we had an accurate index of sales by merchants we should find that it moved along with or ahead of orders, but I doubt it. I am inclined to believe that buying by the merchant is for the most part buying in anticipation, and that evidence is here given in confirmation of that theory of the business cycle which makes the middleman, or jobber, the prime motivator within the cycle.

Before closing, I should like to give some consideration to the belief which I think is prevalent in the minds of some paper merchants, that statistics are not as important to merchants as manufacturers. This belief seems untenable when you consider first that about 80 per cent of the merchant's dollar is represented by material cost against only about 45 per cent of the manufacturer's dollar; and second, that the relation of inventory to capital is much greater in the case of the merchant than the manufacturer. I think it can be proven that a change of 10 per cent in price will mean anywhere from 1½ to 2 per cent decrease to the merchant in his net profit on sales. A merchant who was watching the statistical charts was well aware of the impending break in November, 1923, and if he cut down his inventory, say, 20 per cent, he probably saved the equivalent of one or two month's normal net profits. I quite fail to see wherein statistics mean any more to manufacturers than to jobbers.

I recommend that members now reporting take this matter up with non-reporting members in their various local associations.

No change is contemplated in the statistical plan now in effect. It is believed to be wholly satisfactory, and it will be our aim to put it across in the best way possible.

Mr. Ridgway on Statistics

MR. RIDGWAY: Mr. Chairman, I would like to say a word on the story of the statistical situation. You are all aware that at the October meeting we made certain changes in the plan. The changes had two objects: first, to cut down the work required of the individual member in making his reports, and I think we were successful in that; the second was to get better data on which we could picture to the members the statistical position of the paper merchants. All those things, such as the latter objects, can be worked out beautifully in theory, but sometimes they don't actually check in when you come to apply them concretely. These new methods have been in effect now three or four months, and there are no indications at the present time that in theory or practice

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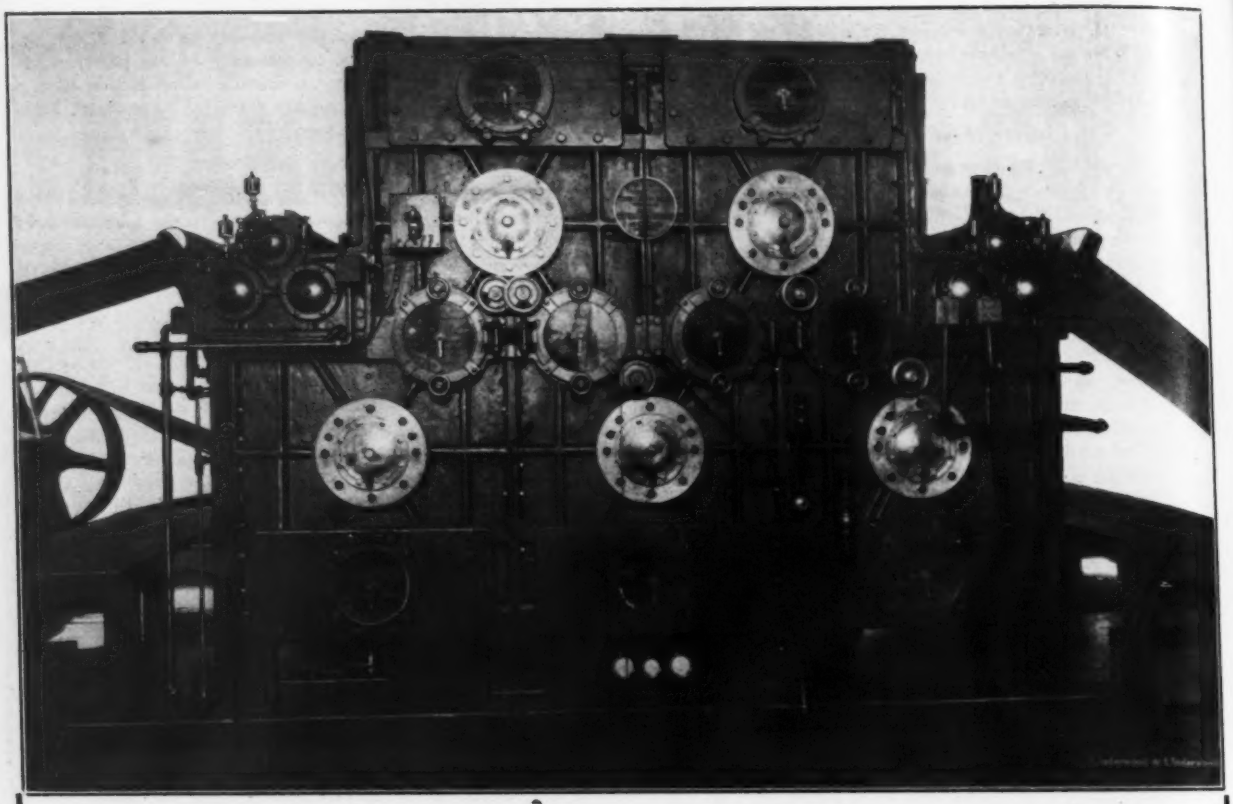

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they are wrong in any way; in other words, the practice seems to check right in with the theory. However, I have the feeling that as an association—or as an association officer; I will put it that way—it would be wise to take a couple of months before we start a campaign to get more members. We want to be absolutely sure that this thing is right, from a practical standpoint. We believe it to be, and as far as we have gone there is no indication that we are not correct. I have the very definite feeling that as time goes on this department is going to become just as valuable to the members of this association as the accounting department is, and you all are prepared to admit that we can't get along without the accounting department.

I am personally convinced that this department can be developed in a way that will produce just as valuable results. Now, as it stands at the present time, the amount of labor required has been reduced, and we should have the support of a great many more members of this association than we have. We propose within the next few months to start a campaign to interest other members, to bring back those who had reported in the past, but who for one reason or another ceased to do so. In a large number of instances I think it was due to the fact that in reducing expenses to meet the bad situation in 1921 the number of clerks were reduced, and it seems rather difficult to carry on that work.

Now, I believe that since that time your office forces have become reorganized and that it would be perfectly feasible and practicable for every one of you to get this data at no additional expense whatever. It might require a little readjustment of the duties of your various clerks, but it could be obtained and, in addition to what the association will get out of it collectively, I believe that the information will prove of great value to the individual himself.

Executive Committee Work

MR. RIDGWAY: Gentlemen, the Executive Committee were in session all of the afternoon of Monday, and they have two matters which they desire to bring before the Fine Paper Division.

First, they recommend the passage of the following resolution:

"Resolved, that the Vice-President appoint a committee of five to consider ways and means of promoting direct by mail advertising, which committee shall report at the next meeting."

I don't think that that resolution needs any explanation. The idea back of the Executive Committee in recommending this resolution is that there may be ways and means of increasing the use of paper, and that is the real object, I assume, of all you gentlemen, to increase the use of paper and get your full share of it.

THE CHAIRMAN: Gentlemen, what is your pleasure with the resolution as presented?

(On motion duly made, seconded and carried the resolution was adopted as presented.)

Book Paper Trade Customs

MR. RIDGWAY: The Committee also desires to report that the Committee passed a resolution interpreting Section 9, subdivision B, of the Book Paper Trade Customs, which reads as follows:

"Paper shall be close to the weight ordered, subject to a variation in the nominal weight not exceeding five per cent above or below the ordered weight when between 45 pounds and 100 pounds basic weights, and eight per cent when below 45 pounds, or above 100 pounds basic weight. Paper within this range shall constitute a good delivery.

"The interpretation of the Committee is that under this Section paper is presumed to be uniform in weight and that it did not permit of as wide a variation as ten or sixteen per cent between material portions of the shipment."

This section has caused a number of misunderstandings in deliveries of Book Paper where portions of the delivery were above the normal weight and within the range of five per cent, and portions of it were below the normal weight, and still within the five per cent; and it is the belief of your Executive Committee that that custom was not passed and adopted and agreed to with any idea of permitting a delivery of that sort. It was simply to take care of manufacturing difficulties and that paper was presumed to be of uniform weight, that is, paper in one delivery.

I don't know that that requires any action of this body, but it should be borne in mind in cases of this character that that is the interpretation we have put upon it. Of course, in the absence of the Book Paper Manufacturers' Association, it is impossible at this time to take that subject up with any organization of manufacturers and obtain their approval of it.

That is all the Executive Committee has to report.

THE CHAIRMAN: Is there any motion you would like to make on the Executive Committee's report, any discussion? Well, we will pass to the next report, the report of the Accounting Bureau, Mr. Schoenbucher.

Report of Accounting Bureau

MR. N. A. SCHOENBUCHER: Whenever I get up before such a wise and august body as this I often wonder whether some of the older and wiser men in the trade don't think that some of us younger fellows take ourselves too seriously.

In coming into the close contact that I do with the various details, the methods and practices which prevail among your customers' printers, and the ways in which they buy paper, suggests a number of things and brings about a number of conclusions, some of which may be sound and some of which may be unsound. It seems to me, from a careful study of the detailed statistics of the habits of the buyers of printing paper, that the cost of distribution in the paper business as we are doing it today has not reached its peak yet. As an example, is direct by mail advertising a good thing, and should some people use it and others not. I don't think there is a man in this room that would say that everybody should not use direct by mail advertising or advertising of some sort, who has some service or some commodity to sell; and let us take, for example, the small tea shop and the small retail businesses existing all over the country, hundreds of thousands of them. Some do a great deal of this. They are starting in now, and perhaps in the next two or three or four years there will be created a large class of buyers of printing. Of course, those orders are going to be small, and small orders are quite costly to handle on the present basis by which we transact the distribution of paper, and if my premise is right, then it looks as if the cost of distribution might increase on the present basis or the present methods, a careful study of our cost of doing business is a very important factor at this time. This has no direct relation to this paper which speaks of the cost of doing business, and it happened to fit in with the Program Committee's report, and that will be treated separately.

The first paper is entitled "Thirteen Years of Trade Evolution." I have tried to put down on paper the things which you men are entirely familiar with, but perhaps have not summed up in your mind all at one time.

Changes in Paper Business

It is questionable whether there exists in the mind of any individual a clear conception as to, first,—what underlying changes have taken place in the paper merchandising business since, let us say, 1910; second,—how these changes have affected operating results; and third, what remedies are safe, sound and available for individual merchants to adopt in order to improve the generally unsatisfactory net returns existing through the trade based on present operating conditions.

While sufficient facts are not available to prove the following statements as to degree they will be recognized to be generally true in principle, namely,—

1. In 1910, a very large part of the value of stocks carried by a great many merchants were on consignment. Today the prac-

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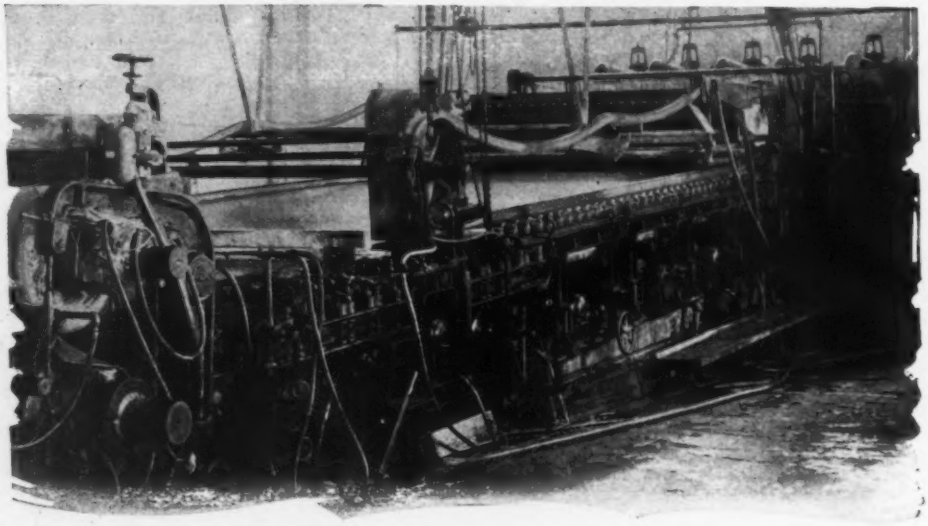

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Skayef self-aligning ball bearings reduce wear to a minimum, do not drop out of alignment but maintain original settings. The true rolling motion of hard steel balls in hardened races of steel permits rolls to turn easily, without sticking, binding or jerky motion, insuring a more uniform stock.

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tice of consigning merchandise is uncommon in the trade with few exceptions.

2. In 1910, the turnover of merchants' stocks was more frequent than now because of the wide custom and practicability of selling job lots and because generally fewer items of merchandise were carried.

3. As late as 1910, printers stocked paper to a considerable degree. This made the selling of job lots practicable in those days. Now printers' paper stocks throughout the country show an average of less than two per cent of the total value of printers' sales. Practically no stocking of papers prevails among printers today. This change in the buying habits of printers between 1910 and the present time has been accompanied by a heavy increase in orders placed with paper merchants for quantities less than case lots, and less than ream lots, and also a great increase in orders involving fractions of a package along with full packages.

4. In 1910 the orders and tonnage distributed of the better grades of flat papers showed a much higher ratio to total orders and tonnage than prevails at present.

5. The two preceding factors jointly have driven the average sales value per order down to a much lower relative amount than that which prevailed in 1910.

Survey of Order Values

To paint an even more impressive picture of the decline in quantity and value per order, consider for a moment the survey of order values made by merchants all over the country in 1922.

Practically all merchants found that about 40 per cent of their orders were for sales of less than $5 each and about 60 per cent were for less than $10 each. Paper prices or values in 1922 can be said to have been, in round figures, about double those prevailing in 1910. Thus if the ratios of small quantity and low value orders to total sales had been the same in 1910 as they are today then

(1) 40 per cent of merchants' orders in 1910 would have been for less than $2.50 each with an average value of about $1.34 per order, and

(2) 60 per cent of merchants' orders in 1910 would have been for less than $5 each with an average value of about $2.70 per order.

We may well wonder what the percentage cost of doing business would have been in 1910 if such a condition had prevailed.

Not Now Consigning Paper

In 1910 the custom of consigning merchandise was almost universal on many kinds of paper. Today, in total tonnage, the practice may be said to be insignificant. Thus, in 1910 the risk to merchants of market losses on the aggregate stocks on hand was relatively slight. Now, it requires no Solomon to understand that where consigned merchandise prevails to a considerable degree the percentage of net profit on sales need not be anywhere near as great as where practically no consigned merchandise prevails, in order to show the same return on capital, and also the same margin of safety to capital at risk.

Thus, if in monetary value, one half of a merchant's stocks were on consignment in 1910, and none, or practically none, of his stock were on consignment today, then a net profit of 2½ per cent on sales in 1910 would give a merchant about the same return on his capital as 5 per cent net on sales would in 1922, other things being equal. Thus if merchants are to earn the same return on capital now as was earned before the war, they must earn twice the percentage of net profit now as they did then, and furthermore, with double the capital at risk for a given amount of sales, the rate of profit must be even more than double that of 1910, if capital returns are to be fully equalized.

The Present Situation

In view of the above, it hardly seems necessary to go to further ends in order to show why most paper merchants failed to earn legal interest on capital in a reasonably normal year such as 1922.

Let us consider the year 1923. I believe it is correct to state that it is the universal opinion of business men or students of economics that the trend of all commodity prices will be downward in the next five or ten years. Opinions in this respect differ as to time and degree, but not as to fact. Therefore any year from, let us say, 1920, which fails to show a recession of prices can be said to be slightly above normal as to the effect of prices on net profits, and any year within which prices actually advance can be said to be considerably above normal as to the effect of prices on net profits. Of course, volume and excessive price declines are factors to be considered, but to ignore these fluctuations is not to destroy the accuracy of the above statements of fact.

I have investigated the 1923 prices of several papers of various grades in each of the following classes: Bonds, Ledgers, Thins, Coated Books, Uncoated Books and Covers. The analysis shows that the average value of all of the brands investigated taken together was about 7 per cent higher at December 31st, 1923, than at January 1st, 1923, including those which declined in November, 1923.

A good merchandise turnover in the paper business in markets close to mills would be about 3½ times per annum. This means that to sell $600,000 out of stock (not mill business) a merchant must keep his inventory around $130,000, assuming gross margins of 25 per cent on sales out of stock. In markets distant from mills a 2½ times turnover would be very satisfactory.

Assuming, first that the above price test establishes the fact that values increased about 7 per cent within the year on the brands investigated, and second, that 3½ per cent times is the maximum average turnover which can be made on merchandise sold from warehouse stocks, then merchants who handled the identical brands used in this test made a gain of about $9,100 in 1923 on an inventory of $130,000 and this amounts to 1.5 per cent on sales of $600,000.

An increase in prices of 7 per cent would also produce 7 per cent more gross revenue for a given tonnage if such increases had occurred at January 1st. As a matter of fact, most of such increase stretched along from January to about March or April, but offsetting this, the principal loss occurred in November so that the actual increase was undoubtedly more than 7 per cent in gross revenues. A gross margin of 25 per cent on sales of $600,000 out of stock would amount to $150,000 and 7 per cent of this would amount to $10,500. Deducting from this amount additional sales compensation of say, 25 per cent, assuming that commission or salaried salesmen participate immediately or eventually in increased gross margins, we have left $7,875 net additional revenue produced by reason of advancing prices which amounts to 1.3 per cent of sales of $600,000. Now, let us apply these facts to a merchant who showed a net profit of 3½ per cent on his warehouse sales before paying income taxes, for the year 1923.

Percentage of Total Net Profits on Warehouse Sales		3.5%
Less: Gain from Inventory	1.5%	
Gain from Additional Gross Revenue	1.3%	
		2.8%
Percentage of Merchandising Net Profit on Warehouse Sales		.7%

In other words, such a merchant earned less than 1 per cent on his sales from merchandising in 1923, using 1922 prices as a basis.

Now, if we assume that exactly the same tonnage and prices will prevail in 1924 as prevailed in 1923, then the above merchant will derive no earnings whatsoever from inventory gains in 1924. Therefore, his net profits for 1924 under these favorable conditions would amount to 2 per cent on the sales, namely, 3.5 per cent less a gain of 1.5 per cent from inventory.

On the other hand, if we assume that prices will recede in 1924 by exactly the same amount as they increased in 1923, but that the above merchants' 1924 tonnage will be as great as 1923, then he

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U. S. A.

will have no gain from enhancement of inventory values but will lose the amount previously gained instead and his additional gross revenue of 7 per cent will be lost. He would then have the following result for 1924:

Percentage of Merchandising Net Profit on Warehouse Sales	.7%
Less: Loss from Inventory	1.5%
Percentage of Net Loss on Warehouse Sales for 1924	.8%

Mill business is not affected by inventory losses, and because of the much lower percentage of gross profits on this business a loss of gross revenue from receding prices would be slight. But, in the insidious part which mill business plays lies in the fact that net profits made from mill business often obscure the true results from warehouse operations to merchants who have not fully adopted the Association's Uniform Accounting Plan.

Least That Should Be Earned

It is generally accepted that 5 per cent net profit on sales is the least which should be earned by any merchandising business if the business is to show a satisfactory profit. Occasionally, the statement is made that "the majority of merchants have never in their history averaged anything like such a percentage over any consecutive five-year period and yet men have gone into business and after years of effort have accumulated a substantial net worth." The inference is that for this reason the business must be sound and that the future will take care of itself. Therefore, let us not deceive ourselves. Percentages of net profit on sales in the past are no criterion to future returns in the paper merchandising business. The foregoing points in connection with consigned merchandise alone show very clearly, that with many merchants 5 per cent net profit on sales today (were any so fortunate as to show such a percentage) would only about equal 2½ per cent before the war in capital return.

Summary

Adequate, sound remedies must be found to correct present conditions. They will not just happen; they must be found. Let us review what has happened, before, during and after the war so as to crystalize impressions into a definite understanding of the effects of changes in the underlying operating conditions of paper merchants.

1. Prior to the war:

(A) Large quantities of consigned stocks gave merchants an opportunity to do a large volume of business on a smaller capital, thereby increasing capital turnover, and reducing risk of inventory losses.

(B) Turnover of merchandise owned was greater because of fewer items, unlimited territory and ability to sell job lots in large quantities out of stock.

(C) Ratio of fixed capital invested in delivery equipment, office equipment, etc., was far less than at present on total tonnage because a given tonnage was distributed with fewer deliveries, less bookkeeping, etc.

(D) There was no income tax to pay, or rather federal taxes were inconsequential.

Because of the above conditions, 2½ per cent net profit on sales was equal in those days to about 5 per cent net profit on sales today, in so far as returns on invested capital of many merchants are concerned.

2. During the war:

(A) Large gains were made from enhancement in the value of merchandise on hand.

(B) Rising prices caused gross revenues to increase at a more rapid pace than expenses increased.

(C) Heavy borrowings from banks, abnormally prompt payment of accounts by customers, and feverish demand for paper greatly increased capital turnover.

Because of the above conditions, good net earnings were made on invested capital (not sales) regardless of the unsound ratio of operating expenses to merchandising margins.

3. Now:

(A) With about double the amount invested for a given volume of sales with many merchants, capital turnover is cut in half and capital risks are doubled.

(B) Declining prices reduce gross revenues faster than expenses recede.

(C) Declining prices incur heavy market losses. A horizontal decline of 10 per cent, in prices wipes out from five to seven months of good net profits.

(D) Federal income taxes take one-eighth of net profits where prior to 1909 there were no Federal taxes and between 1909 and 1915 Federal taxes only took one-hundredth part of net income.

These conditions have disclosed an unsound ratio of operating expenses to merchandising margins in the businesses of the rank and file of paper merchants. Do not fail to recall your net profits for such a good business year as 1923. If they appeared to be fairly good in your case remember how possibly three-fourths of your net profit may have been earned because of conditions beyond your power or influence as was pointed out in a previous paragraph.

Personal and Operating Differences

Some of you undoubtedly will not subscribe to the foregoing conclusions. But always let it be remembered that there are personal and also operating differences between some merchants and others to which can be attributed different degrees of success. Some of these differences arise from a well-ordered purpose or design and some arise involuntarily or accidentally. For example, there are differences in the ratios of certain classes of product distributed to total business; there are differences in house policy, some merchants having expediency and others principle as their constant watchword; there are differences in the calibre of internal management; there are differences in outlook, some chasing profits by the circuitous way of the phantom, volume or tonnage, and others by the shorter and surer course of refinements; and finally, some cling to the merchant prince idea of exclusive ownership and sole responsibility, while others bend every effort to delegate responsibility, to safeguard capital risk, and to stimulate effort, by inducing important and even minor executives to become active stockholders or partners in the enterprise.

It should therefore not be surprising if a merchant having the edge in some or all of the foregoing operating factors partly by accident and partly by design will refuse to subscribe to the statements heretofore made by me. Yet I know that my conclusions strike the large majority of our membership.

It seems opportune and appropriate therefore to state that all those who do agree that the paper merchandising business is not on a satisfactory merchandising net profit basis for the reasons stated hereinbefore (or for any other reasons) should commence to cast about with a view of first ascertaining whether each has his own house in the best possible order. For many, this will be a difficult task, undoubtedly. As to the merchant prince, however, his task is extremely simple. The times are cruelly pressing upon all princes of the royal purple. The exits for him are yawning wide.

H. H. Seyler, of the Alling & Corey Company, Pittsburgh, Pa., here delivered a fine address on a "Plea for Common Sense, Not So Much a Matter of Where, But How We Do," which was listened to with close attention.

Report of Program Committee

LEON BECK:—Mr. Chairman and gentlemen: I would like to preface the report of the Program Committee by saying that I will give you an outline of what we have attempted to do during the year, and that this report will be supplemented by two of the committee in some of the findings that have been developed, as well as some interesting points that Mr. Schoenbucher has developed.

At our semi-annual meeting last October, this association author-

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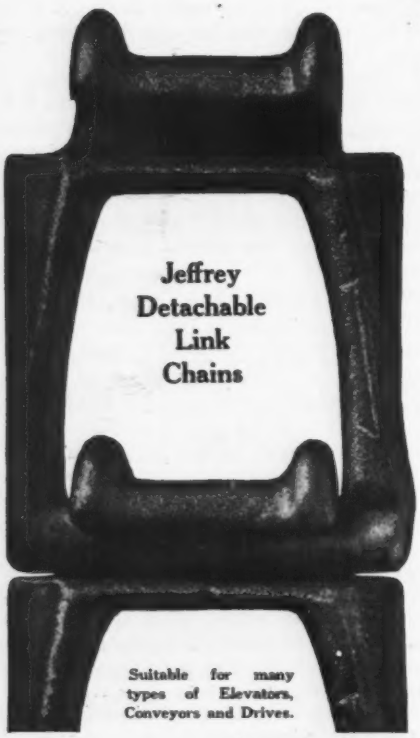
Jeffrey Flat and Round Chain. When used with Pipe swivel attachment as shown, it makes an excellent conveyor for handling wet and dry straw.



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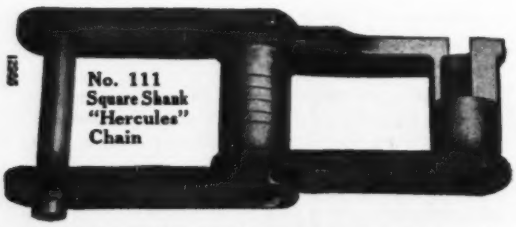
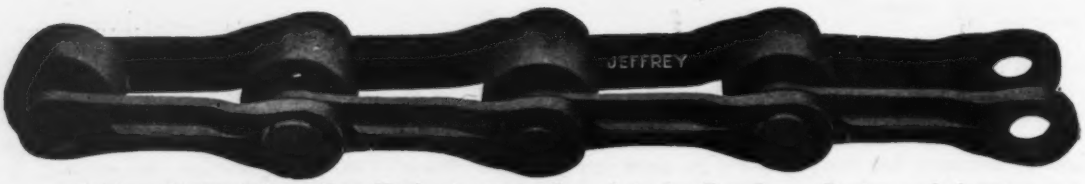


An excellent chain for wood conveyor service. Extra metal being added where the barrel comes in contact with the sprocket tooth, greatly increases the life of the chain.



Jeffrey Malleable Roller Chain is an excellent chain for Dry Straw Carriers and Apron Conveyors for handling packages and freight.

ized the appointment of a National Program Committee of the Fine Division.

You will probably recall that the function of this committee was to determine such subjects which, at this time, might be considered of paramount importance to the well-being of our industry, and that the committee recommend such subjects to the local associations for their investigation, with the understanding that the findings of the local associations be reported back at the time of our annual meeting in April.

Accordingly, a committee was appointed, consisting of W. N. Gillette, Charles S. Proctor, Charles Addome, Albert M. Miller, Leon Beck, chairman.

Each member of this committee was asked to express the subject, or subjects, which to his mind were of importance to his local association, and as a result of reports received from these committeemen, the following subject was decided upon: How Can Paper Distribution Be Made More Efficient?

The subject was outlined as follows:

No. 1.—Warehouse Expenses:

A. Cost of space, which includes heat, light and power, depreciation, repairs, insurance.

B. Cost of handling, which includes liability insurance, stock insurance, wages of warehousemen, packing supplies, cutting or converting expenses.

No. 2.—Delivery:

A. Teaming and truck costs.

B. Prepare freights and expressages.

C. Unusual or unnecessary long hauls.

No. 3.—Sales Expenses:

A. Cost of advertising, gratis sample sheets, advertising appropriations, sample books, dealers' sample cabinets.

B. Salesmen's compensations.

C. Traveling expenses.

No. 4.—Administrative and Office Expenses:

A. Stenographers and clerks.

B. Telephone and telegraph expenses.

C. Competition on credits.

D. Collection expenses.

No. 5.—Merchandising:

A. Investment in slow sellers—either items or brands.

B. Expense of breaking reams on sales above unit packages.

This subject was then sent to the presidents of the various local associations, with instructions to appoint a committee in the Local Association for a definite study of the question in hand. These reports were received at the Executive Committee meeting, held on Monday of this week and a thorough discussion of the subject resulted.

I wish to state at this point that the Program Committee of your National Association is more than gratified with the response which arose from the call for ideas and suggestions on the subject selected. In fact, I could almost state for the committee that it was veritably swamped with very good material.

The time at our disposal in this meeting does not permit a complete reading of all these reports. Moreover, as might naturally be expected, there is some overlapping and repetition in each of the reports. It is the hope and wish of the committee that you will listen with especial attention to the reports about to be given to you and that the general matters brought to your attention here will be given your serious consideration when you return home. These reports, while of a somewhat general nature, will give you food for serious thought. It is planned to have the office of the association follow up these reports with a specific outline to you in the near future.

One of the local program committee chairmen told the Executive Committee a very interesting story of some recent experiences which were directly stimulated by his chairmanship of the committee. He began to look around for any slight waste which might exist in his business. As he walked through his warehouse several days ago he noticed a lot of money being wasted in the form of lights being lit needlessly. He did not only give thought to ascertain the possible waste, he investigated the matter more closely and found that all of the lights were of the 25-watt variety, whereas the 15-watt size would have been ample. He therefore immediately changed to 15-watt lamps and this alone enabled him to effect a considerable saving.

Mr. Noble Gillette has submitted a very fine report for the Western Association. He touches on every department of the business interestingly and vitally. His paper alone could be amplified into a book on the subject. I am going to call on Mr. Gillette to read you his report. Mr. Gillette, of Chicago.

Report for Western Association

MR. GILLETTE: I presented a report to the Western Paper Merchants' Association, and owing to the fact that it duplicates some of the subjects brought out already, and most of the topics have been touched on, I rather fear that this may bore you by reason of its repetition.

Most instructive movements have their inception through necessity. Obviously increased net profits are derived from increased sales, increased gross profits or reduction of expense or any two or more of these factors. With present sales resistance the first is uncertain. Owing to competition, differences of opinion among and between merchants and mills on marketing policies and because of buying habits, the second presents great difficulties. The third, reduction of expense, seems to offer the greatest possibilities for immediate relief. That of the many subjects suggested to the Program Committee, the one selected, "How Can the Distribution of Paper Be Made More Efficient and Economical," was the one all local associations included in their reports which was highly indicative of the common ground of necessity for greater net profits.

The breadth of the subject precludes any treatment except along the broadest lines and this report of the Western Paper Merchants' Association Committee is presented as such.

However, a continued and more detailed study of this subject with interchange of statistics and information will surely result in much benefit to all.

No. 1. Warehouse Expense.

A. Cost of space.

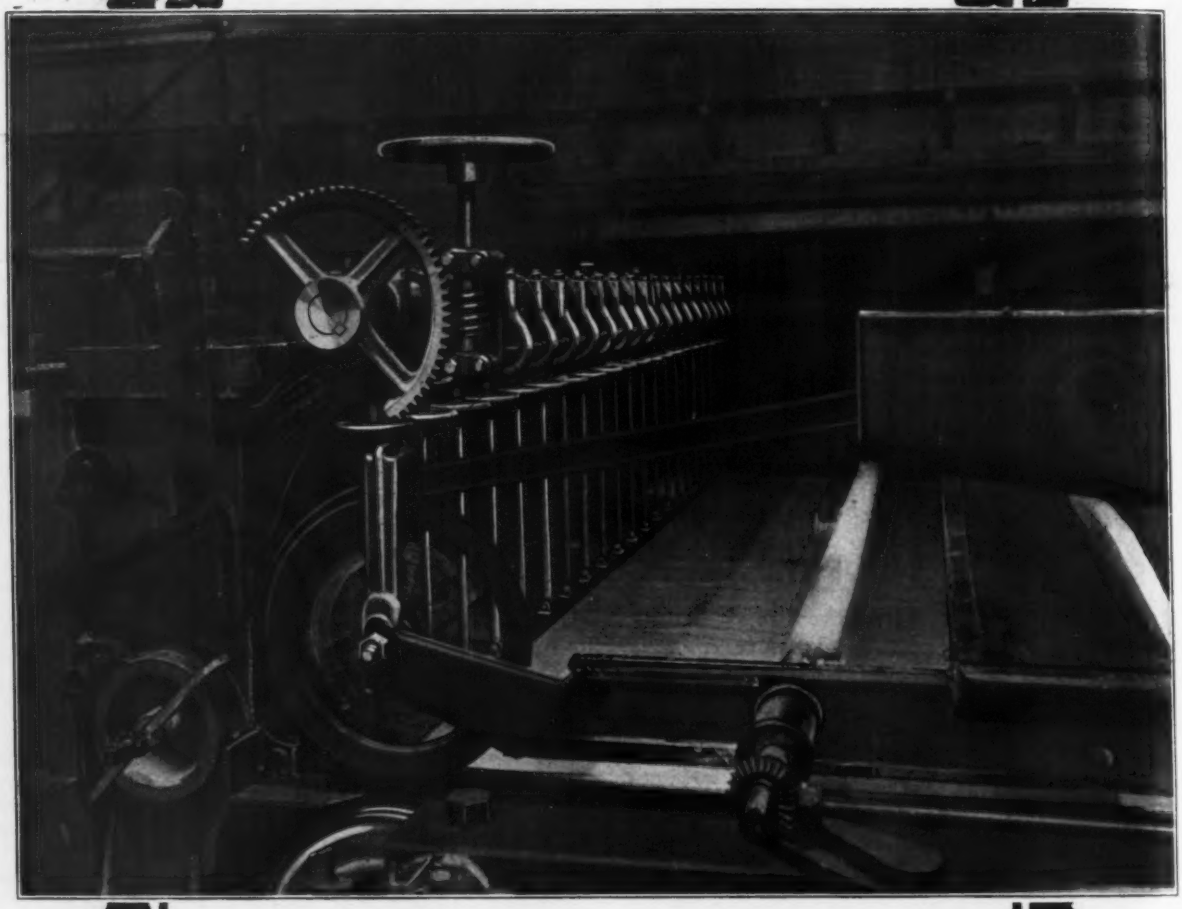
Whether to own and operate your own building exclusively for your own business—own and operate your own building and sub-rent space—rent a building for your own requirements—or rent a building and sub-rent space is entirely an individual problem depending on local situation and personal conditions.

Location as to rental value per square foot, accessibility to incoming freight and redistribution should be carefully considered. Space should be reduced to a minimum by eliminating slow moving items and lines. Rearrange stocks to take maximum advantage of available floor space. Reduce aisles where feasible. Plan floor space by aid of maps. Where practicable, have shelves or bins to ceiling heights with best moving items on lower tiers. It is questionable whether steel shelving save enough in space to justify their additional cost. Adjustable shelves are often desirable. Keep heat on stock floors to a minimum. See that lights are turned out when not in use. Use smallest candle power practicable. If necessary install modern lighting equipment. Use elevators and power machinery carefully and for the purpose intended. Keep equipment up by making minor repairs when needed, thereby reducing depreciation and repair bills. Install and equip with fire prevention apparatus and methods that will reduce insurance rates. Investigate reciprocal companies whose rates are often lowest.

Analyze Cost of Handling

B. Analyze cost of handling with the view of reducing operations, overlapping efforts, waste of time, etc. Investigate packing methods and materials used in packing. Eliminate inefficient help and meth-

The Voith High Pressure Stock Inlet



Better Paper at a Greater Speed

By eliminating aprons and slices on a Fourdrinier machine Voith High Pressure Stock Inlets prevent foaming, do away with much wear and tear on the wire, thus increasing their life and add from two to three feet to the length of the wire for formation purposes.

With no slices to cause contraction of the stock, and with an easily adjusted stock gate paper of uniform caliper can be made across the entire width of the machine. A deckle washing device on the Voith Inlet eliminates the cumbersome pans on the machine itself.

The stock can be fed directly onto the wire at the breast roll at any speed desired, thus creating greater production. In one mill an increase of 10% resulted, in another 20%.

Write for a booklet giving full particulars.

Valley Iron Works Co.

Plant: Appleton, Wis. New York Office: 350 Madison Ave.

ods. Check up on items cut down or cut from double size and revise stock items carried based on this information. One member reports eliminating two men from the warehouse by the saving made through installing an electric case piler at a cost of $754. With this piler, the cases could be piled higher and more quickly. Another member has saved materially through the simple practice of putting ordinary meat skewers between all cases. This greatly facilitates the moving of cases. Other members find it economical and efficient to handle all bundle goods on platforms. Bundles are unloaded from trucks or cars on to wooden platforms and placed in stock on these platforms with a removable truck. Many houses have installed spiral chutes, lifts and other handling devices that expedite the handling of goods. Most houses consider it an economy to make their own frames for packing and frequently use old envelope cases for this purpose. Others buy short lengths or sortings of lumber from the lumber companies at a much lower price than standard lengths and which even serve their purpose just as well.

No. 2. Delivery

A. Reduce number of deliveries, thereby reducing the equipment and having larger loads. Route deliveries carefully. Reduce delays at loading platform and at the customers' plants. Investigation in the larger cities indicate that electric trucks are a considerable economy over either gasoline machines or horse drawn vehicles. This is a matter that will require particular analysis for each market as traffic conditions differ widely. Other lines of business use extensively removable bodies for their auto trucks allowing of full loads to be removed at one time from the machine and also loading bodies in the warehouse and running them on to the machine without delay.

B. Eliminate prepaying of freight and express.

C. Establish reasonable delivery limits.

No. 3. Sales Expenses

A. Analyze, revise and maintain mailing lists. Send only advertising material of such grades as customer is interested in or equipped to handle. Plan advertising material, keeping postage in mind; also utilizing stock sizes in paper and envelopes. Wherever possible, send half sheets on sample requests instead of full sheets. Maintain file of sample sheets of stock to eliminate time and waste. Budget advertising appropriation on the basis of object to be accomplished, probable sales and profits in the line. Suggest to mills closer consideration of merchants' needs in planning mills, sample books, etc. Place sample sets and sample cabinets with consideration of probable returns therefrom. Place only such sample sets in customers' hands as their requirements necessitate. Keep sample sets checked up and maintained. A very definite savings in postage and advertising material can be effected through the use of the selector-type of mailing machine. The plates for this machine allow of twenty-four different selections so that the mailing list can be selected from the standpoint of what each account should receive and the machine will select just the item desired to send to each class. This insures each account receiving only the material in which he is interested and eliminates waste and duplication. A great saving can be effected in service samples, sample cabinets, etc., by providing each customer only with the material that he can use to advantage instead of the complete sample sets.

B. Adopt such plan of salesmen's compensation as best fits the needs of your particular business, giving careful consideration to the advantages and disadvantages of the various systems. Keep aggregate salesmen's compensation within the average limits of houses doing a similar character of business in the same territory. There seems to be a very definite trend to eliminate excessive and unnecessary entertainment expense, many houses placing this expense entirely on the salesmen. The subject of salesmen's compensation covers such a wide field and there are so many different methods in vogue that this is a matter for each house to study and decide upon.

C. Analyze salesmen's territory with the view of allowing minimum traveling expense; also route salesmen in territory to obtain maximum efficiency in covering same.

No. 4. Administration and Office Expense

A. Improve methods where possible and eliminate inefficiency.

B. Watch telephone and telegraph expense carefully. Many unnecessary calls and wires can be eliminated.

C. Exchange information with local houses on credits.

D. Proper investigation of accounts before extending credit will eliminate much needless collection expense.

No. 5. Merchandising

A. Maintain perpetual stock inventory. Study sales records carefully. Carry minimum stocks consistent with sales. Eliminate slow selling items and grades. Keep monthly tonnage record of stock sales.

B. Consider advisability of charging for broken packages even when accompanied by an order for full package of same item. Educate printer and consumer to order in units of even packages.

It is recommended that the various houses budget their expenses, sales, gross and net profit each year and also make a periodical survey and analysis of each department.

I can only add that this is a very general summary of what was read to the Western Association meeting, but I do feel that by a more detailed study of this subject and an interchange of information, that a great deal can be accomplished.

Broken Package Evil

MR. BECK: You have heard Mr. Gillette's interesting summary of ways and means whereby expenses may be reduced. We shall next take up a subject which is perhaps the most serious single problem awaiting some satisfactory solution, namely, the broken package evil. When we think of broken packages, we customarily think of an order for less than a full package and we are inclined to overlook a great many orders which call for a full package and a fraction of the same item on the same order. There is reason and justification for a printer ordering 275 sheets of papers in such terms, but in many instances there is no logical reason or justification for printers ordering 1,875 sheets or 3,650 sheets, or any such quantities as these, and yet there is not a house represented in this room which does not receive many of such orders each day. A job for a mailing list requires a specific quantity of paper which may not work out in even packages and therefore such uneven orders will always be with us, but jobs for office forms and letterheads and other general printing could be ordered in such units as to require only full packages, where the order exceeds a ream of paper. This whole matter may be summed up by stating that the printer today orders paper by the sheet, whereas the mill puts up paper at considerable expense in unit packages and you are obliged to go to considerable duplicate expense by undoing what the mill has done and then doing it over again. If the present style of packing paper is wrong, let us find out why and let us take means to effect the necessary changes. But if the present style of packing paper is not wrong, then, I believe, gentlemen, that it is high time that we find some means of inducing the printer to buy his paper in units of mill packages—not for the purpose of putting paper on the shelf but for the purpose of delivering such quantities to his customer as will come from even packages.

Report by Mr. Warner

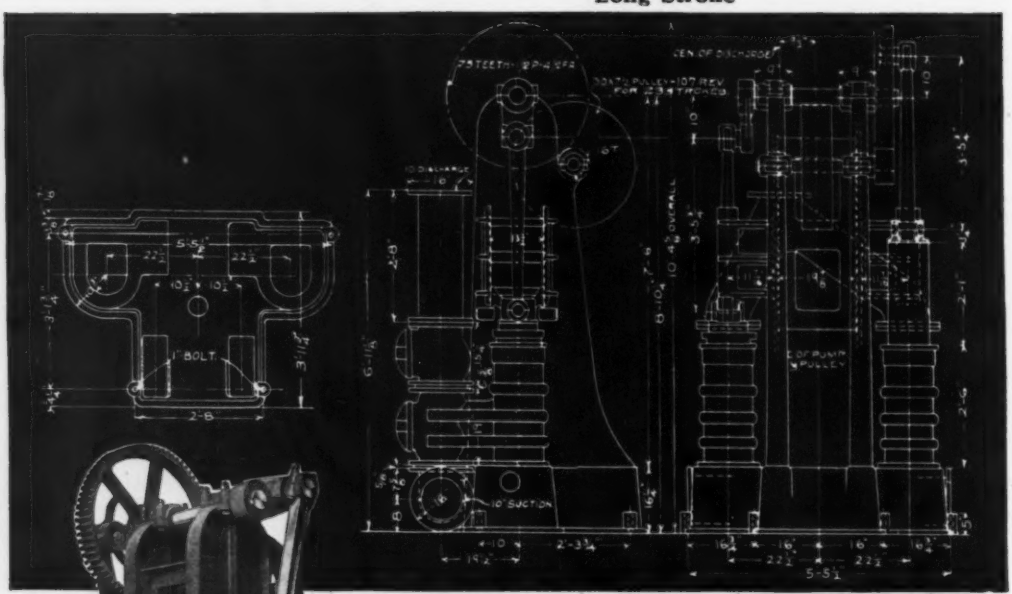
Mr. Warner, chairman of the New York Committee, has a most vital report to render here and I shall now call on Mr. Warner. Mr. Warner, gentlemen.

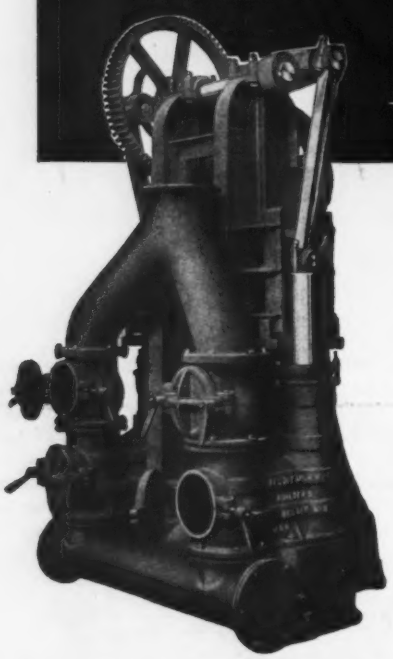
MR. K. S. WARNER: As chairman of the New York Committee, Mr. Chairman, it seems to me that all I have to say has already been told. Mr. Schoenbucher has incorporated in his report much of this report. Mr. Beck has taken part of it, but possibly the report will show you how they got their stuff.

The Program Committee of the New York Association gave care-

Beloit Heavy-Duty Duplex Stuff Pump

Long Stroke





THE ILLUSTRATION at the left shows the popular BELOIT No. 178 Pump, built for heavy duty. Made in sizes, 8″ x 20″ and 10″ x 20″. Plungers, ball valves and seats are of bronze; crank pin bearings are bronze bushed. Equipped with self-oiling guides. Has hinged hand-hole plates through which both balls and seats may be inserted. Guides are adjustable to wear. Furnished with or without suction and discharge pipes. Blueprint diagrams above show various dimensions.

Send us your pump specifications.

Sizes and Weights

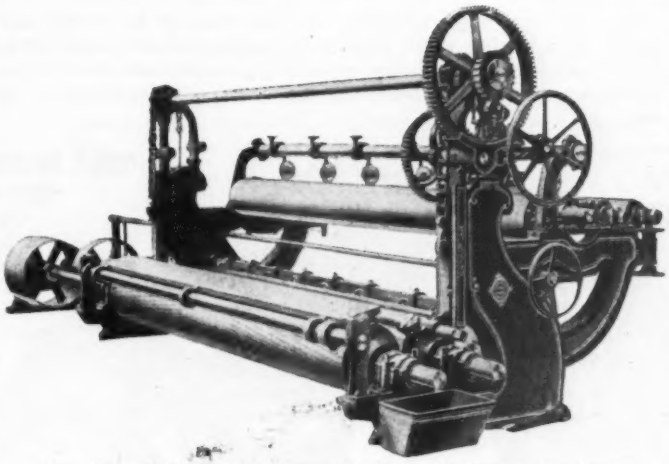
SIZE	NET WEIGHT	WEIGHT BOXED	CODE WORD
8″x20″ Suction and Discharge connected.....	6,500 lbs.	8,300 lbs.	Adopt
8″x20″ Suction and Discharge not connected...	5,600 lbs.	7,150 lbs.	Adore
8″x20″ Suction connected only	6,125 lbs.	7,825 lbs.	Adrift
8″x20″ Discharge connected only	5,975 lbs.	7,625 lbs.	Adroit
10″x20″ Suction and Discharge connected.....	8,300 lbs.	10,600 lbs.	Adgers
10″x20″ Suction and Discharge not connected ..	7,200 lbs.	9,500 lbs.	Adobe
10″x20″ Suction connected only	7,850 lbs.	10,150 lbs.	Adolphus
10″x20″ Discharge connected only	7,650 lbs.	9,950 lbs.	Adonis

Beloit Iron Works **Beloit, Wis., U. S. A.**

Established **Since 1858**

BELOIT IRON WORKS PAPER MACH'Y BELOIT WIS.

Repeat Orders for the Beloit Double Drum Winder



No. 87B—Beloit Double-Drum Winder, with Slitter Attachment

REPEAT orders can mean only one thing—complete satisfaction. Sixteen repeat orders from one mill, nine from another and batteries of four and five from many others—orders like these are recommendations that speak their own story forcibly.

If you require a dependable winder that will operate consistently and economically under pressure of high speed production, your choice should be the "BELOIT." What it has done for others, it can do for you.

Write us for special winder information blank. It will make it simple to quote you on your needs quickly—and without the slightest obligation.

Beloit Iron Works BELOIT IRON WORKS PAPER MACH'Y BELOIT WIS. **Beloit, Wis., U. S. A.**

Established Since 1858

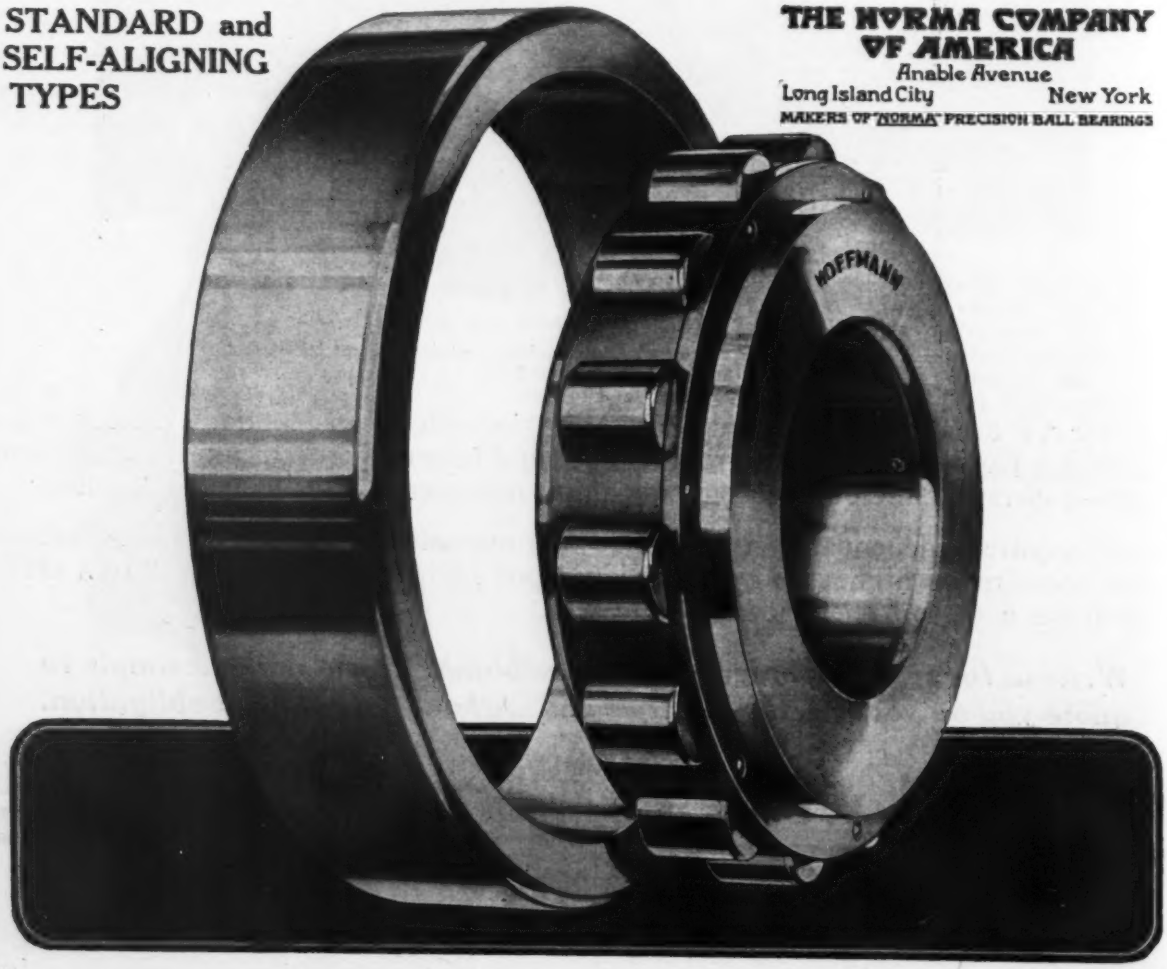
HOFFMANN PRECISION ROLLER BEARINGS

For Heavy Loads and Hard Service

Heavy-duty units manufactured to unequaled standards of precision; affording the maximum of serviceability under conditions involving heavy loads, temporary overloads, shock, jar and vibration; offering to manufacturers and users of paper and pulp mill machinery new opportunities for power saving, reduced upkeep costs, and better service.

Our engineers will welcome an opportunity to work with yours, in applying these high-duty, high-precision bearings to your machines, with a view to securing maximum anti-friction efficiency, minimum maintenance costs, and continuity of service.

STANDARD and SELF-ALIGNING TYPES



THE NORMA COMPANY OF AMERICA
Anable Avenue
Long Island City New York
MAKERS OF "NORMA" PRECISION BALL BEARINGS

ful consideration of the general outline recommended for study and consideration by the Program Committee of the National Association, and because of the shortness of the time involved concluded that it would confine its efforts to one specific problem, namely, an investigation of the broken package evil.

The committee, therefore, requested twenty New York paper merchants to submit an analysis of one week's warehouse sales in order to disclose the ratio of orders and also dollars and cents of sales in the various quantities for which price differentials are provided. Ream sales, that is, sales between the ream and the case, were subdivided so as to show how many of such orders involved a fraction of a package along with the full package.

Twenty houses were called upon merely because there was not sufficient time to canvass the entire trade in New York. Of the twenty houses, two failed to report, two sent their reports in too late for use on the summary and five sent in reports which were not complete or, for some other reason, were not comparable with the others. It is gratifying to note that eighteen out of twenty houses were willing to give the association this intimate information, which speaks well for our local association.

In order not to burden you with too much detail I shall read the percentages of orders in each subdivision for, first, the house showing the highest percentage of broken package orders, second, the house having the lowest percentage of broken package orders and the average of the entire eleven houses who reportd.

	High House	Low House	Aver. of 11 Houses
1. Total orders—warehouse business..	100%	100%	100%
2. Percentage of orders calling for less than one original package.....	45.	27.	35.8
3. Percentage of orders calling for even packages up to but not including cases	17.5	29.	28.9
4. Percentage of orders calling for one or more full packages accompanied in each individual instance by a fraction of a package up to but not including cases.....	35.8	23.2	28.7
5. Percentage of orders calling for case and ton quantities.....	1.7	20.1	6.6
6. Total percentage of orders requiring breaking of packages and physical counting of sheets (items 2-4)	80.8	50.2	64.5

While the average of all of the houses who reported means nothing, still to leave a definite figure in your mind, I would call your attention to the fact that an average percentage of 64.5 per cent of the orders call for a count, namely, call for less than one package or for one and a fraction package. Taking a house having 300 orders per day, and using this average of 64.5 per cent, we find that about 195 orders of such a house involve a count. If there were an average of 200 sheets per count, this would mean that the stockmen of such a house would be required to count 39,000 sheets per day. This, of course, is a mere guess. The expense involved, plus spoilage and errors in count, also where stockmen add a few extra sheets to make sure of their count, is at once apparent.

Wrong in Principle

Standard papers are put up by the manufacturer in unit packages, while the printer and stationer are buying paper by the sheet regardless of the manner in which it is wrapped. This is undoubtedly due to the fact that the printer and stationer in most markets do not stock paper, but buy for each individual order. Packing of paper in certain package units and the sale thereof by the sheet is obviously wrong in principle, and some way should be found to reduce the broken package evil. It is a serious waste and drain on the merchants' net profits which have generally reached a very thin line between expense and revenue. A penalty of the fraction assessed upon orders of a ream and a fraction would probably have a beneficial effect. Such a remedy, however, is not altogether advisable,—better a campaign of education that would tend to show the printer the economy of more nearly fitting the printer's job to the unit package.

GENERAL MEETING OF THE PAPER TRADE ASSOCIATION

The general meeting of the National Paper Trade Association was called to order at 2:15 o'clock, Wednesday afternoon, at the Waldorf-Astoria by President Frank W. Powers.

THE CHAIRMAN: It is certainly a pleasure to note the large attendance at all of the meetings. They are not all here at this time but I think they will be here, and this morning they were all largely attended.

I see by the program of this meeting that the first business is a report of the president. I do not know of anything I have to report more than you already know or what you will know when this session is over. I will say, however, that it has been most gratifying in attending the meetings of the Executive Board to note the intense interest that has been shown at all Board meetings. Very careful thought has been given to all the subjects under discussion and I think we all agree that this means much to all interested in the paper industry. So I think I can safely say that in all the meetings I have attended the trend of thought has signified the necessity and the desire for the establishment of a closer cooperative policy between the merchants and the manufacturers, and a policy that can be maintained.

At this time I wish to express my thanks to the members of the association for the very loyal support they have given me during my administration and also to express to Mr. Ridgway and Mr. Higgins—who has disappeared—for the untiring efforts on their part to successfully carry on the work of the association.

In conclusion, I want to suggest that where it is feasible, instead of waiting until the regular meeting of your associations come around, if possible, that you call meetings of your local associations, so that the subjects we have considered here can be taken up when you men return and they are fresh in your minds.

The next business is the report of the Secretary.

Secretary's Report

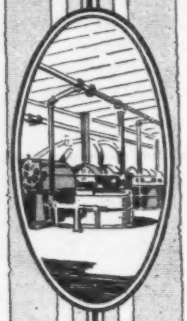
This meeting marks the twentieth anniversary of the organization of this Association. A preliminary meeting was held late in 1903 but formal organization was not perfected until February the 8th, 1904, at the time of the annual meeting of the American Paper and Pulp Association. We observe among those present today a number of members who were in attendance at that meeting and it would be interesting, were the time available, to listen to their reminiscences of the happenings of twenty years ago.

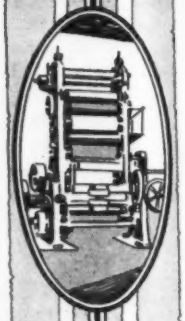
Conditions Far from Satisfactory

A comparison of conditions in the industry today with those of 1904 leads to the conclusion that they are now far more satisfactory from almost every angle and, without fear of contradiction, we firmly assert that the National Association was a most powerful influence in effecting the changes which have occurred and has unquestionably proved its value to the paper merchants of the country.

The individual membership of the constituent associations shows an increase of 24 over a year ago and numbers 367 today as against 343. This increase is most gratifying but we believe it will require active effort on the part of the officers of the local associations

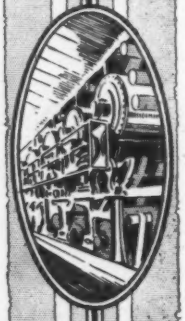
Standardize on Standard Lubricants

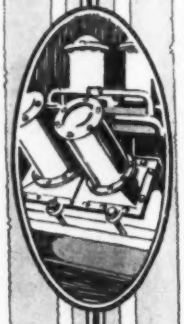




YOU will find it to your advantage to use only Standard Oils and Greases made by the Standard Oil Company [Indiana]. Every lubricant you need in your mill can be obtained in any quantity from this one source.

That you may be absolutely certain that the most economical lubricants for each place will be used, you have at your service our staff of lubricating engineers. These men have had years of practical experience and in addition, are thoroughly familiar with the characteristics of Standard Lubricants. They spend all of their time in the field, studying, observing and recommending the proper lubricants to reduce friction losses. They will help you in every way possible at any time you may call on them.



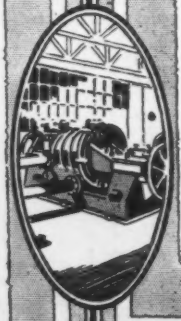


By concentrating your oil and grease purchases, you will cut down on the number of lubricants required. You will not have to carry in stock large supplies of those you do use. Our trucks will deliver what you need for a week or two. The balance will be carried in the Standard Oil Company [Indiana] warehouse nearest to your plant, and a 'phone call will be all that is required to replenish your supplies. You will have no hauling charges to meet on barrels to and from freight depots.

Decide now to standardize on Standard Lubricants

You will make an actual dollar and cents saving, but your biggest saving will be the reduction in friction losses and the attendant reductions in repair and replacement costs.

A 'phone call or letter to our nearest branch will bring you more details.

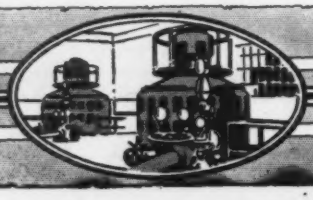


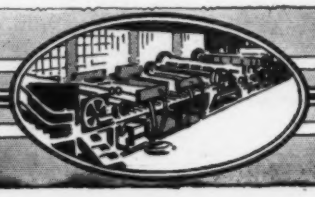
STANDARD OIL COMPANY

(INDIANA)

910 S. Michigan Avenue Chicago, Illinois

ILLINOIS	INDIANA	IOWA	MICHIGAN	WISCONSIN	MISSOURI
Chicago	Evansville	Davenport	Detroit	La Crosse	Kansas City
Decatur	Indianapolis	Des Moines	Grand Rapids	Milwaukee	St. Joseph
Joliet	South Bend	Mason City	Saginaw	MINNESOTA	St. Louis
Peoria	KANSAS	Sioux City	N. DAKOTA	Duluth	
Quincy	Wichita	S. DAKOTA	Fargo	Mankato	
		Huron	Minot	Minneapolis	





to keep up present membership. Competition is certainly keener today than for many years and, in a highly competitive market, there is a tendency on the part of a considerable number to ignore customs and even ethics in seeking business. When such practices prevail, and we regret to admit that in some small measure they do exist today, there are always some members who hold the Association responsible and hand in their resignations. We have never been able to understand by what line of reasoning these men reach this conclusion for, if any one really gave thoughtful consideration to the problems, he would be forced to the conclusion that if it were not for the Association, conditions of this character would undoubtedly be worse. However, we would urge the officers of all local associations to be on the lookout for the development of this tendency in their respective territories.

Associations Visited

During the year, some representative of the National Association has visited every constituent organization. Your Secretary in addition to visits to Detroit, Washington, Philadelphia, Cleveland, Chicago and Boston, has made two extended trips—one to the Pacific Coast, and the other through the Central States and into the south, visiting Pittsburgh, Cincinnati, Indianapolis, Louisville, St. Louis, Memphis, Nashville, Birmingham, Atlanta and New Orleans. The later trip was made with Mr. Schoenbucher and was largely in the interest of the Wrapping Paper Division.

Cost Accounting Department

We are strong in our belief, based on three years' experience, that the Cost Accounting Department, under the most able direction of Mr. Schoenbucher, has been of the utmost value to the Association and to the individual member. The greatest present need in paper merchandising is accurate knowledge of costs of distribution. Until relatively recently paper merchants almost without exception were satisfied to know the results of their operations annually or at most, semi-annually. They cared not at all for details as to what lines or what class of sales produced a profit or a loss and, if the results were on the wrong side of the ledger, they knew only two remedies, increase of sales or reduction of expense. Today, a majority of the paper merchants of the country know general results each month, and many are obtaining figure facts which enable them to know where and how they are making their profits and even more important, where and how they waste effort in sales which are unproductive of profit. More and more time is being devoted by the individual to a study of the detail of his business. We are confident that the work of the accounting department is largely responsible for this much to be desired condition and the department, in addition to promoting the adoption of the "Uniform Classification of Expense," so that figures of individual houses will be comparable, will continue its studies of costs of distribution both as a stimulus to the individual to seek like knowledge of his own business and to point out generally ways and means for the reduction of the cost of the distribution of paper. The willingness of the members to furnish facts called for has been most gratifying. As time goes on, and the studies become less general in character, there will be greater need for figures more in detail and it is our hope that those members having any required facts will continue to furnish them to the Association for the general good.

Legal Limitations

We again wish to bring specifically to the attention of the members the legal limitations of the Association's activities in this direction. It can develop the facts and, having done so, must leave the remedy entirely and exclusively to the individuals. It cannot suggest the remedy and it would seem to us that to do so would be entirely unnecessary for, if the facts are properly developed and presented, and the individual finds upon investigation that they apply to his business, he will eventually find the remedy. It is our personal belief that the steady growth in influence and the present strength of this Association can be attributed in a measure to the fact that it has refrained from the use of methods indulged in by a few trade associations which are tainted with illegality and, in our opinion, nothing will cause its present influence and strength to wane quicker than an endeavor to cure by illegal means any unsatisfactory condition which may develop.

A little over a year ago, Mr. Pape took over the management of the Statistical Department. He has a thorough training in statistical work, and a real interest in and enthusiasm for the development of the plan. After a thorough study of the entire situation, he recommended certain changes both as to the data collected from the members and the form of presentation, which were adopted at the fall meeting to become effective January 1st. The new plan has already been fully explained at the divisional meetings but we want to again urge upon the members a fuller measure of support for this department. We feel that ignorance upon the part of the individual has been the main reason for a greater number failing to avail themselves of the knowledge to be obtained from statistics. We believe that those members who attended the divisional meetings now fully realize the value of the statistics and we are hopeful that before the next annual meeting, at least one hundred members will be reporting in each division.

Direct Selling Decreasing

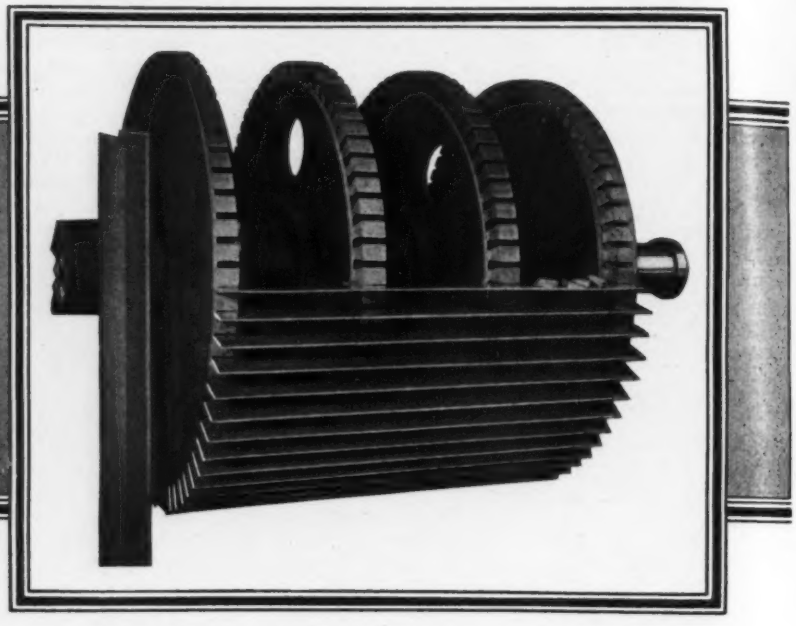
Direct selling by manufacturers is decreasing in most lines of paper. During the past year one prominent book paper manufacturer, who had distributed through his own warehouses in a number of cities, closed them and has established merchant distribution. Another book paper manufacturer has appointed agents in the two cities where he has been distributing solely through his own warehouses. This certainly is a cause for gratification. A considerable number of the members handling wrappings report an increased tendency on the part of manufacturers of these lines to seek direct business, while others state that such tendency has not come to their notice. Whether this tendency exists country wide is immaterial for there are undoubtedly too many such sales of wrappings. The extent to which the association can legally go in an endeavor to curb this evil is today uncertain. If the views of the Federal Trade Commission, as reflected by certain of the provisions of the cease and desist order entered in the proceeding against the Pacific States Paper Trade Association, represent the law, the association is bound hand and foot and can make no move whatsoever. The provision of the order to which we refer goes so far as to prohibit the association, or any two or more merchants, acting in concert, from even communicating directly or indirectly with a manufacturer upon the subject. An appeal to the court to review this order has been taken and we believe this order of the commission will not be sustained. In our opinion, there is nothing illegal in the presentation to a manufacturer by an association of the economic reasons why he should not sell both the paper merchant and the merchants' customer provided boycotting, black-listing, etc., are not indulged in. There is, however, no uncertainty relative to the right of the individual, acting purely as such, to oppose direct selling. The Supreme Court of the United States has recently held that an individual has an absolute right to refuse to buy from a manufacturer who sells direct, either for that reason or for no reason at all. It would seem to be wisdom for the association to proceed carefully until such time as its rights or limitations are more clearly defined but there is no need for the individual to hold back in the slightest degree. He may go the limit with absolute safety.

Severe Price Competition

Business has not been satisfactory. There seems to be no doubt that in tonnage distributed, 1923 was nearly equal to 1920, the record year, and had price competition been less severe, the year would have been entirely satisfactory. There is a measure of satisfaction, however, in the fact that it was better in all respects

Dilts-

Better Beater Rolls



DILTS Bandless Beater Rolls have revolutionized the making of roofing felt.

Dilts Rolls beat off the stock in forty-five minutes—formerly four hours or more were required.

Dilts Rolls give from three to six years service—formerly the service was seldom more than six months to a year.

Dilts Rolls have practically eliminated beater roll troubles—formerly beater rolls were a constant source of danger and expense.

Nearly 600 Dilts Bandless Beater Rolls are installed in the Roofing and Board Mills today.

SPECIFICATIONS

Four cast steel heads shrunk on and keyed to shaft.

Special alloy steel fly bars, heat treated. Bars held at four points by steel keys driven home.

No shims; perfect fits at all four points; no loose bars.

Bars easily and quickly removed without taking roll from bearings.

Fly bars always sharp edged; never burr over. Superior design and correct mechanical construction.

The simplest and strongest beater roll built. Your present rolls can be built over to this type.

6537

Dilts

MACHINE WORKS, Inc. FULTON, N.Y.

EXPORT OFFICE ~15 PARK ROW~ NEW YORK CITY

than either of the last two preceding years. The basic trouble appears to be the large increase in productive capacity. We have heard it said, and are inclined to believe, that the increase in paper making capacity in the past five years is sufficient to take care of the normal increase in demand for another ten years. Even assuming that this is an exaggerated estimate, the increase in some lines is so great as to warrant the conclusion that during the next five years at least, the capacity is ample to more than meet any demand which may arise. It, therefore, follows that for some few years to come competition, based on price, will be at least as keen as it has been the past year and it will require the most intelligent management on the part of the paper merchant to produce a net profit anywhere near commensurate with the volume done. As to values, there seems to be little likelihood of any declines based on cost of production which is probably higher than a year ago, and such declines as may come will be due to a lack of balance between supply and demand. A relatively slight recession in demand is likely to seriously effect this balance.

General Business

Conditions in general business are not entirely satisfactory. Some lines of business show no signs of slowing down but others have recently and rather unexpectedly experienced serious falling off of demand. If we properly reflect the reports from individual members, the demand for paper since about the middle of last month has not kept pace with that of the first two and a half months of the year. This condition is of insufficient duration to permit of any conclusive deductions as to the future, but it is sufficient to warrant the exercise of caution.

Treasurer's Report

The Treasurer's report for the year ending March 31, 1924, was read by A. J. Corning, the Treasurer.

Simplification Program

William A. Durgin here reported on the Simplification Program.

Address by O. D. Street

A splendid address was delivered at this point on "Efficient Distribution," by O. D. Street, formerly manager of distribution of the Western Electric Company, and now director of distribution of Thomas F. Logan, Inc.

Code of Ethics

MR. RIDGWAY: The board desires to recommend the adoption of a Code of Ethics as reported to the Board of Directors by the Code of Ethics Committee, of which B. W. Wilson is Chairman. Mr. Wilson will present that report.

MR. WILSON: I just have two thoughts to present to you. The first thought is that the presentation of a code to you is not the individual thought of any member of the Trade Association. It emanates from the Baltimore and Southern Paper Trade Associations.

The second is that the paragraphs as presented to you in this code is not a presentation of the ideals of any individual member of this committee, but we would rather show a magnanimous spirit and ask you to make this your code and not the code of your committee.

The National Paper Trade Association recognizes that the high ethical standards now prevailing in the paper merchandising business are directly attributable to an individual adherence to the principles herein below stated, and believes that the restatement and promulgation of these principles will perpetuate the present high ideals.

First: I will act honorably in my business of paper merchant, and conform in all things to the highest standard in the industrial world, so that my business shall be worthy of my devotion and ideals.

Second: I will conduct my business so that it shall compel the respect and confidence of all who trade with me.

Third: I will not bear false witness against my fellow merchants and competitor, nor belittle him, nor impugn his honor, nor covet his success.

Fourth: I will deal fairly and courteously with customers, neither misleading them by false promises, nor misusing the confidence which I gain.

Fifth: I will seek the co-operation and good will of the manufacturers, and by treating them with fairness and by fulfilling my obligations to them, gain their faith and trust.

Sixth: I will be just to my employees, seek to earn their respect and loyalty, and inspire them to the practice of these principles.

Seventh: I will conform to trade customs that are honorable, and keep faith with my trade associations when their principles are constructive and tend to the advancement of the paper industry.

Eighth: I will do unto others as I would they would do unto me, for by my deeds will I elevate all business practices.

Gentlemen, there is no argument in favor of a Code of Ethics in any trade or association. Within the last eight months over fifty trade and professional associations in this country have either adopteu or proposed a code of ethics. This is nothing new in the industrial world. It is simply an educational movement throughout this country to promote and advance better business methods. I have been associated actively with this association for fifteen years, and I may take opportunity to tell you that this is my valedictory. I have already notified my association that they will have to look for another national representative after this meeting, but if I have never done anything else than to participate in this movement, I will feel that it has been a great pleasure and a great privilege to present to you an opportunity to promote in this industry the movement that tends to better business methods and practices of our trade.

This is presented to you for your consideration; this is no movemen on the part of the committee. We will not individually nor collectively undertake to thrust upon you a code of ethics. It is your code and not our code. It is up to you fellows as to whether you want a written code or not.

(On motion made, seconded and unanimously carried it was resolved that the Code of Ethics as presented by Wilson, Chairman of the Committee, be accepted and adopted).

MR. WILSON: Now, gentlemen, your board considered how we would promulgate and gain publicity to this code. It was agreed in the board that we would send from the national office to each individual member a copy of the code and then, upon application of the individual membership of the National Association, supply additional codes to the different members, and I hope it will be your disposition to order sufficient codes for your different departments, not only for your offices, but for your warehouses as well.

MR. RIDGWAY: The board also desires to report for the information of the members the fact that the Executive Committee of the American Paper and Pulp Association has voted to do away with the fall meetings in October and to move the annual meetings from April back to February. This action, as I understand it, of the Executive Committee, or council, of the American Paper and Pulp Association, is in the form of a recommendation and will have to be acted upon at a meeting of the American Pulp and Paper Association tomorrow morning.

That information was placed before the Board of Directors and by resolution the board passed a vote that it was the sense of the meeting, that is, of the Board of Directors, that these changes be approved. I think that is all that the board desires to bring directly to your attention, except nominations.

THE CHAIRMAN: Like a good many other meetings, this was pulled off on time, and earlier in the meeting the secretary, in making his report, referred to the fact that this association is twenty years old today. Therefore, I consider it very appropriate that we hear from our first president, through whose guidance it

Exceptionally Clean Rossing of Wood is Apparent in this Picture

The Right Equipment for Rossing Wood Proves Equal to Almost Any Difficulties

THERE ARE conditions at the Woollings mills at Connaught Station, in Ontario, that constitute a severe test of the tumbling method of barking—and the machinery employed for it. How well they have met the requirements is indicated by the appearance of the rossed wood in this photograph.

The logs that show up so clean and smooth in the picture were even more impressive as actually viewed and handled. All these logs were driven in shallow, slow-moving water; the bark was uncommonly "tight." In spite of which, the drums of the type used at Woollings' made a practically perfect job of removing it.

Just two drums handled the large quantity of wood thus rossed at Connaught mills in 1923, notwithstanding the character of wood and the production to be maintained. Such performance is due to a number of things; perhaps the first that should be mentioned is ideal inside surface of the drums, represented by the U-Bars. The wood in these drums *does* get a lively tumbling, which is the reason for the considerable higher capacity than in drums with smooth inside surface. Furthermore there is no brooming of the wood as caused by angles or channels. Another important point is the sound principle and equally sound building that permitted these drums to run the season through without interruption. It is unusual for heavy-duty machinery of the kind to stand up to the work month after month with no shutdowns. This in turn points to a number of features in the design which spare these drums the racking that heavy logs give equipment not so carefully conformed to the task. One of these advantages lies in the chain suspension, eliminating bearings underneath. The chains constitute slings in which the great weight of the drum is evenly distributed over a full half-circle of its circumference. Contrast this with trunions! One hundred twenty-eight equidistant points of support (in the case of a 10x30 drum) instead of eight bearing points. The spring takeups not only provide an equalizer for all chains but act as shock absorbers that function perfectly at all speeds. To this, add the strength of the specially rolled U-Bars, which cannot be even approximated by any standard or fabricated shape suitable for barking drums.

But the easiest way to be sure of the capacity and longevity of our drums is to rely on the experience of mills where they have been in use for years. There are over a hundred such. We would like to send you an unabridged and unedited list of all, and some pictures, facts and figures about barking drums made and sold on a definite understanding of their capacity for work and their suitability to your individual problems. Address—FIBRE MAKING PROCESSES, INC., LONDON GUARANTEE & ACCIDENT BLDG., CHICAGO, ILL., U. S. A.

was that the section of this association was made possible, and I take great pleasure in calling on Mr. O. A. Miller, our first president.

Mr. Miller Speaks

O. A. MILLER: It is certainly a great privilege to stand before you at the end of twenty years and note the success that has come to us from the vision and hard work of the few of us who started the association. I think I should like to tell you who these men were. Thirty years ago the idea of dealers' associations was promulgated. I think it was established in 1894, thirty years ago. In the next decade there were six developed as follows: Boston, New York, Baltimore, Northwest, Central States and the Western, which was the first. I think at the time this organization was first started that I was president of both the Western and the Central States. The gentleman who more than anyone else is responsible for calling the meeting in this city in November of 1903, is John E. Linde, who has since gone to his reward. Mr. Linde was our first secretary and served splendidly, and I think to his untiring work, more than anything else, we are indebted for the fine start that we got.

The others who were in at the beginning in November—the organization was made at that time and ratified in February—I think all of the original officers representing six associations that were then in existence, were made permanent in February following.

W. F. McQuillan, president, Boston Association.
W. B. Livermore, secretary, Boston Association.
W. D. May, president, New York Association.
Hazard Lasher, secretary, New York Association.
E. T. Mudge, president, Baltimore Association.
Gordon L. Reese, secretary, Baltimore Association.
E. J. Stillwell, president, Northwest Association.
P. N. Myers, secretary, Northwest Association.
E. U. Kimlark, secretary, Western Association.
H. F. Woods, treasurer, Central States Association.
J. A. Church, secretary, Central States Association.

This was our first organization, completed, as has been intimated, in February, 1904.

Since that time we have witnessed the growth and prosperity of the association and have all profited by the influence that has come through our efforts, until today I think we have a mighty fine organization. If I have been able to contribute anything in any small way to the furtherance of this, it is a great pleasure, and I predict that now that we have got a fair start we shall have a glorious future. I thank you.

THE CHAIRMAN: The next business is report of the Nominating Committee.

Nominations Presented

MR. RIDGWAY: Gentlemen, under our form of the organization the Board of Directors acts as a Nominating Committee, and as such the board desires to present the following nominations for the ensuing year:

President, William F. McQuillan, of Boston.

Vice-President in Charge of Fine Paper Division, A. M. Miller, of Columbus, Ohio.

Vice-President in Charge of Wrapping Paper Division, J. A. Carpenter, of Kansas City, Missouri.

Treasurer, A. J. Corning, of Baltimore, Maryland.

We might say in explanation of the fact that Mr. Lindenmeyr has not followed the usual course from vice-president into the presidency that it is due entirely to the fact that he has been ill, as explained at the meeting this morning, spent some five months in the hospital last year, and under the specific and definite instructions of his doctor, he feels compelled to withdraw.

Recognition of Mr. McQuillan's Services

The board thought that it would be desirable at this time to take some recognition of the services of Mr. McQuillan, which have been continuous since organization. He has been a member of the Board of Directors without any gap at any time during those twenty years. Unfortunately, he is not here today because of a rather serious accident which occurred to him in the city of Boston about three or four weeks ago. We are glad to say that he is recovering and expects to be around shortly. The Board of Directors at its meeting authorized the sending of a telegram expressing regret at his inability to be here, and the hope that he would make a speedy recovery. I am in receipt of the following wire from him:

"Please convey to the directors of the National Paper Trade Association my sincere thanks for their kind message of sympathy. I cannot express how much I appreciate their even remembering me during a crowded business meeting but it certainly dulled the keen edge of disappointment I felt on account of my inability to be with them.

(Signed)
WILLIAM F. MCQUILLAN."

THE CHAIRMAN: You have heard the list of nomination as read.

The New Offices

THE CHAIRMAN: The secretary having done so I announce the elections for the ensuing year:

President: William F. McQuillan of Boston.

Vice-President in Charge of Fine Paper Division: A. M. Miller, Columbus, Ohio.

Vice-President in Charge of Wrapping Paper Division: J. A. Carpenter, of Kansas City.

Treasurer: A. J. Corning of Baltimore.

The meeting was concluded with felicitous remarks by Messrs. Miller, Corning, Alling and others.

PAPER MILLS CO. EXPANDS

With the removal of a printer tenant who had occupied for many years three floors in its building at 517-525 S. Wells street, Chicago, the Paper Mills' Company came into possession of 30,000 additional square feet of floor space recently and now occupies the entire nine floors and basement of its own building at that address, a total floor space of approximately 100,000 square feet.

The acquisition of this additional space enables the company to rearrange and enlarge both its stock rooms and office space, which was just completed about a week ago. The arrangement of each department has been so carefully planned and the inter-locking departments so grouped, that it would seem impossible not to render its customers and prospective customers the greatest degree of efficient service.

On the second or mezzanine floor, will be found a display and service room, complete in every detail, and in charge of competent people with a knowledge of the problems of the printer and advertiser. In this room is a magnificent display of catalogues, stationery, broadsides and other direct-by-mail pieces from the leading shops in America, as well as some interesting foreign exhibits.

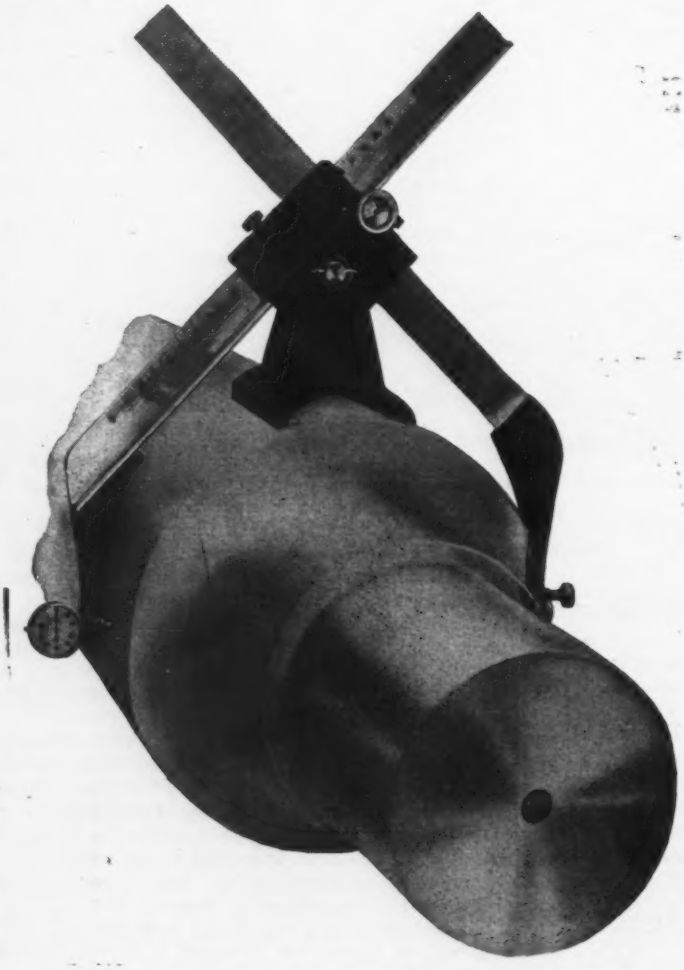
Here, suggestions are given, specimen dummies prepared, general sales helps worked out and actual demonstrations made of the fitness of various papers for any specific work in hand.

The printer, or anyone else interested, is cordially invited to visit the Paper Mills' Company to inspect the new changes.

H. W. SOUTHWORTH'S NEW BOOK

Many of the older paper makers will remember H. W. Southworth, who was head of the Southworth Company of Mittineague, Mass., for fifty years, and will be interested to know that he has recently published a book entitled, "Deceptions of Orthodoxy." This is an appeal to the laity by a layman and is a work of profound thought. It is published by The Economy Publishing Company, 63 Holdenhurst Road, Bournemouth, England. Mr. Southworth is also the author of "Not on Calvary," and "Divine Love Vindicated."

LOBDELL



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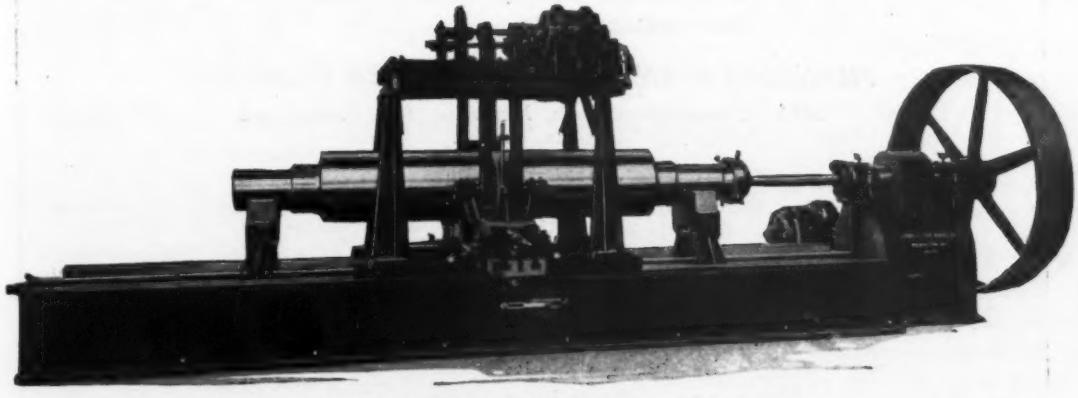

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After months of preparation and testing we are pleased to announce that this organization now has its new kraft paper ready for the market.

We are ready to take orders on strictly No. 1 brown or grey kraft. This means paper of higher strength and more elasticity. Jobbers or manufacturers of envelopes, bags or gummed tape are requested to write our Chicago office stating their requirements.

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A

L. M. Alexander, Nakoosa-Edwards Paper Co., Port Edwards, Wis.
C. A. Alpers, Cleveland Paper Mfg. Co., Cleveland, O.
A. C. M. Azoy, Berwin White Co., East Orange, N. J.
P. M. Allen, Detroit Sulphite Pulp & Paper Co., Detroit, Mich.
L. C. Anderson, W. G. Oglesby Paper Co., Middletown, O.

B

O. Bache-Wiig, Wausau Sulphite Fibre Co., Mosinee, Wis.
C. Barlow, Donnaconna Paper Co., Donnaconna, Quebec.
F. L. Barstow, Ealulah Paper Co., Fitchburg, Mass.
S. F. Boyd, St. Regis Paper Co., Watertown, N. Y.
D. K. Brown, Neenah Paper Co., Neenah, Wis.
N. S. Brown, General Paper & Cordage Co., Pittsburgh, Pa.
Edward S. Burton, A. W. P. Paper Co., Albany, N. Y.
R. L. Bosworth, Crocker-McElwain Co. and Chemical Paper Mfg. Co., Holyoke, Mass.
W. P. Bromley, Hammermill Paper Co., Erie, Pa.
H. R. Baldwin, Hammermill Paper Co., Erie, Pa.
E. H. Benson, Regal Paper Co., Pulaski, N. Y.
H. W. Brightman, Northern Paper Mills, Green Bay, Wis.
C. A. Buskirk, Wolverine Paper Co., Otsego, Mich.
W. M. Blackford, Strathmore Paper Co., Mittineague, Mass.
Dr. G. W. Blanco, Riordan Pulp Corp., Hawkesbury, Ont.
H. C. Barbour, International Pulp Stone Co., Elyria, O.
J. L. Bagg, Millers Falls Paper Co., Millers Falls, Mass.
H. J. Bunck, Abitibi Power & Paper Co., Ontario, Canada.
R. D. Bertschey, Miamisburg Paper Co., Miamisburg, O.
H. H. Brown, Hollingsworth & Vose Co., East Walpole, Mass.

C

P. W. Colwise, Beaver Products Co., Buffalo, N. Y.
H. R. Cantine, Martin Cantine Co., Saugerties, N. Y.
G. N. Collins, Dill & Collins, Philadelphia.
Geo. E. Crafts, Orono Pulp & Paper Co., Orono, Me.
F. A. Curtis, American Writing Paper Co., Holyoke, Mass.
J. H. Coy, Flambeau Paper Co., Ashland, Wis.
W. S. Cummings, Chemical Paper Mfg. Co., Holyoke, Mass.
H. P. Carruth, Mead Pulp & Paper Co., Chillicothe, O.
Gilbert Clark, Lee Paper Co., Lee, Mass.
Howard L. Cheney, Srere Pulp & Paper Co., Franklin, O.
H. J. Corwin, Ajax Paper Mills, Buck Run, Pa.
Samuel Clayman, A. M. Collins Mfg. Co., Phila.
H. S. Coke, Oxford Paper Co., Portland, Me.
E. B. Carter, The Barrett Co., New York City.
Chas. W. Chabot, Jr., Hammermill Paper Co., Erie, Pa.

D

C. P. Detrick, New York & Penn. Co.
A. H. Dwight, Hawthorne Paper Co., Kalamazoo, Mich.
A. M. Daniels, L. L. Brown Paper Co., Adams, Mass.
Ernest Drabeim, Rhinelander Paper Co., Rhinelander, Wis.
W. E. Dawson, Dawson Bros., Ltd., Montreal.
C. W. Dearden, Strathmore Paper Co., Mittineague, Mass.
J. F. Duniger, Miami Paper Co., W. Carrollton, O.
A. H. Dwight, Hawthorne Paper Co., Kalamazoo, Mich.
O. H. Dickinson, Fisk Paper Co., Springfield, Mass.

E

D. C. Everest, Marathon Paper Mills Co., Rothchilds, Wis.
H. W. Ellerson, Albermarle Paper Mfg. Co., Richmond, Va.
Irving S. Esleeck, Esleeck Mfg. Co., Turners Falls, Mass.

F

R. J. Farley, The Upson Co., Lockport, N. Y.
Chas. T. Forster, Alton Box Board & Paper Co.
Wilfred L. Forsythe, Victoria Paper Mills Co., Fulton, N. Y.
Paul S. Fiske, Parker-Young Co., Boston.
A. N. Forsythe, American Writing Paper Co., Holyoke, Mass.
H. D. Frolick, Kimberly-Clarke Co., Neenah, Wis.
H. Fair, Lincoln Mills, Merritton, Ont.
G. W. Fitzgerald, Canadian Export Paper Co., Montreal, Can.
N. W. Fowler, Hampden Glazed Paper & Card Co., Holyoke, Mass.
R. A. Fuller, Gilbert Paper Co., Menasha, Wis.
H. C. Fleischer, Bryant Paper Co., Kalamazoo, Mich.
S. C. Fairbanks, Mt. Tom Sulphite Pulp Co., Mt. Tom, Mass.
A. E. Frampton, Hammermill Paper Co., Erie, Pa.

G

G. W. Gilkey, Michigan Paper Co., Plainwell, Mich.
P. H. Glatfelder, P. H. Glatfelder Paper Co., Spring Grove, Pa.
V. H. Gottschalk, Paper Section, Bureau of Standards, Washington.
Geo. B. Gibson, Wausau Sulphite Fibre Co., Chicago.
Alex G. Gilman, Allied Paper Mills, Kalamazoo, Mich.
O. P. Gehart, Miami Paper Co., West Carrollton, Ohio.
M. F. Gleasner, Paterson Parchment Paper Co., Modena, Pa.
G. S. Gaylord, Menasha Printing & Carton Co., Menasha, Wis.
E. T. Gardner, Gardner & Harvey Paper Co., Middletown, O.

H

Geo. H. Harvey, Gardner-Harvey Paper Co., Middletown, O.
H. H. Harrison, Crystal Tissue Co., Middletown, Ohio.
R. W. Harrington, Kalamazoo Paper Co., Kalamazoo, Mich.
E. J. Hansen, Fort Howard Paper Co., Green Bay, Wis.
R. S. Hatch, Nutley, N. J.
J. P. Hummel, Hummel-Ross Fibre Corp., Hopewell, Va.
Wm. H Howell, Mumford Paper Mills.
Harold W. Hixon, Chapin & Gould Paper Co., Springfield, Mass.

J

W. O. Johnson, Strathmore Paper Co., Mittineague, Mass.
H. J. Joachim, Bogalusa Paper Co., Bogalusa, La.
E. A. Jones, Tarentum Paper Mills, Tarentum, Pa.
F. I. Jacoby, Warren Mfg. Co., Riegelsville, N. J.

K

Helen U. Kiely, American Writing Paper Co., Holyoke, Mass.
J. Kindleberger, Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich.
Kenneth T. King, Du Pont de Nemours, Wilmington, Del.
S. C. Knode, Albemarle Paper Mfg. Co., New York City.
H. O. Keay, Laurentide Co., Ltd., Canada.
A. J. Kirsch, Bedford Pulp & Paper Co., Richmond, Va.
A. F. Klein, Hammermill Paper Co., Erie, Pa.

L

R. H. Laftman, Bogalusa Paper Co., Bogalusa, La.
C. A. Lambie, General Paper & Cordage Co., Pittsburgh, Pa.
H. E. Lindquist, Chemical Paper Mfg. Co., Holyoke, Mass.
Lowell E. Longstreth, Gardner-Harvey Paper Co., Middletown, O.
J. A. Lowe, Falulah Paper Co., Fitchburg, Mass.
W. E. Lennon, L. L. Brown Paper Co., Adams, Mass.
D. E. Lauderburn, Pejebscot Paper Co., Brunswick, Me.
H. H. Lockey, B. D. Rising Paper Co., Housatonic, Mass.

M

C. A. Mansfield, American Writing Paper Co., Holyoke, Mass.
L. W. Mahle, Ohio Boxboard Co., Rittman, O.
Frank Mossteller, Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich.
P. J. Murer, Riordon Pulp Corp., Montreal, Can.
B. T. McBain, Nekoosa-Edwards Paper Co., Port Edwards, Wis.
John McEwan, American Tissue Mills, South Hadley, Mass.
I. J. Marcuse and M. E. Marcuse, Bedford Pulp & Paper Co., Richmond, Va.
E. G. Milham, Bryant Paper Co., Kalamazoo, Mich.
Clarke Marion, Champion Coated Paper Co., Hamilton, O.
H. S. Mead, Mead Fibre Co., Dayton, O.
E. K. Mansfield, Robert Gair Co., New London, Conn.
Herbert W. Mason, Dill & Collins Co., Philadelphia.
Robert Mair, Dill & Collins Co., Philadelphia.
W. R. Maull, Dill & Collins Co., Philadelphia.

N

A. H. Nevins, Miami Paper Co., West Carrollton, Ohio.

O

E. A. Oberweiser, Whiting-Plover Paper Co., Stevens Point, Wis.
J. E. O'Connell, Dexter Sulphite Pulp & Paper Co., Dexter, N. Y.
James J. O'Connor, Mead Pulp & Paper Co., Chillicotte, O.
Geo. N. Ostrander, Finch, Pruyn & Co., Glen Falls, N. Y.

P

R. H. Palmore, Yellow Pine Paper Mill Co., Orange, Tex.
R. L. Pease, Hawthorne Paper Co., Kalamazoo, Mich.
Harold L. Peekham, Hammermill Paper Co., Erie, Pa.
Wm. H. Price, Jr., Angier Corp.
Walter E. Perry, Chemical Paper Mfg. Co., Holyoke, Mass.
L. J. Parant, St. Croix Paper Co., Woodland, Me.

Q

A. E. Qual, Donnacona Paper Co., Quebec.
Daniel L. Quirk, Jr., Peninsular Paper Co., New York City.
J. M. Quimby, Allied Paper Mills, Kalamazoo, Mich.

R

Walter J. Raybold, B. D. Rising Paper Co., Housatonic, Mass.
James F. Ryland, Standard Paper Mfg. Co., Richmond, Va.
Ralph W. Remont, International Paper Co., Pittsburgh.
Jos. D. Reed, Jr., Champion Coated Paper Co., Hamliton, O.
C. E. Rice, International Paper Co., Boston.
K. M. Radsch, Thilmany Pulp & Paper Co., Kankauna, Wis.
Walter C. Ross, Mid-States Gummed Paper Co., Chicago.
H. H. Reynolds, B. D. Rising Paper Co., Housatonic, Mass.
J. P. Russell, Marathon Paper Mill Co., Rothschild, Wis.
Geo. E. Richter, Brown Co., Berlin, N. H.
R. B. Rising, B. D. Rising Paper Co., Housatonic, Mass.
J. T. Robinson, American Writing Paper Co., Holyoke, Mass.
E. Rantoue, Wausau Sulphite Fibre Co., Chicago.
John E. Ross, Sauquoit Paper Co., New Hartford, N. Y.

S

E. B. Sterling, West End Paper Co., Carthage, N. Y.
J. E. Stocker, Graham Paper Co.
B. K. Stadman, Standard Paper Mfg. Co., Richmond, Va.
Edwin Sutermeister, S. D. Warren Co., Cumberland Mills, Me.
D. A. Smith, District of Columbia Paper Mfg. Co., Washington, D. C.
L. B. Steward, Bayless Mfg. Co., Austin, Pa.
G. K. Spence, New York & Pennsylvania Co.
C. W. Stickerman, Whiting-Plover Paper Co., Stevens Point, Wis.
John B. Shepherd, Peninsular Paper Co., 59 W. 45th street, New York City.
C. C. Schneider, Knowlton Bros., Inc., Watertown, N. Y.
L. B. Springsteen, American Writing Paper Co., Holyoke, Mass.
Lester M. Start, Rice, Barton & Fales, Boston, Mass.
V. M. Stouck, N. Y. & Penn Co.
Kimberly Stuart, Neenah Paper Co., Neenah, Wis.
L. B. Springsteen, American Writing Paper Co., Holyoke, Mass.
W. H. Sanburn, Strathmore Paper Co., Mittineague, Mass.
Carlton W. Smith, American Envelope Co., W. Carrollton, O.
H. W. Suter, Champion Coated Paper Co., Hamilton, O.
E. T. Simpson, Eastern Mfg. Co., New York City.
Theodore Safford, Racquette River Paper Co., Potsdam, N. Y.

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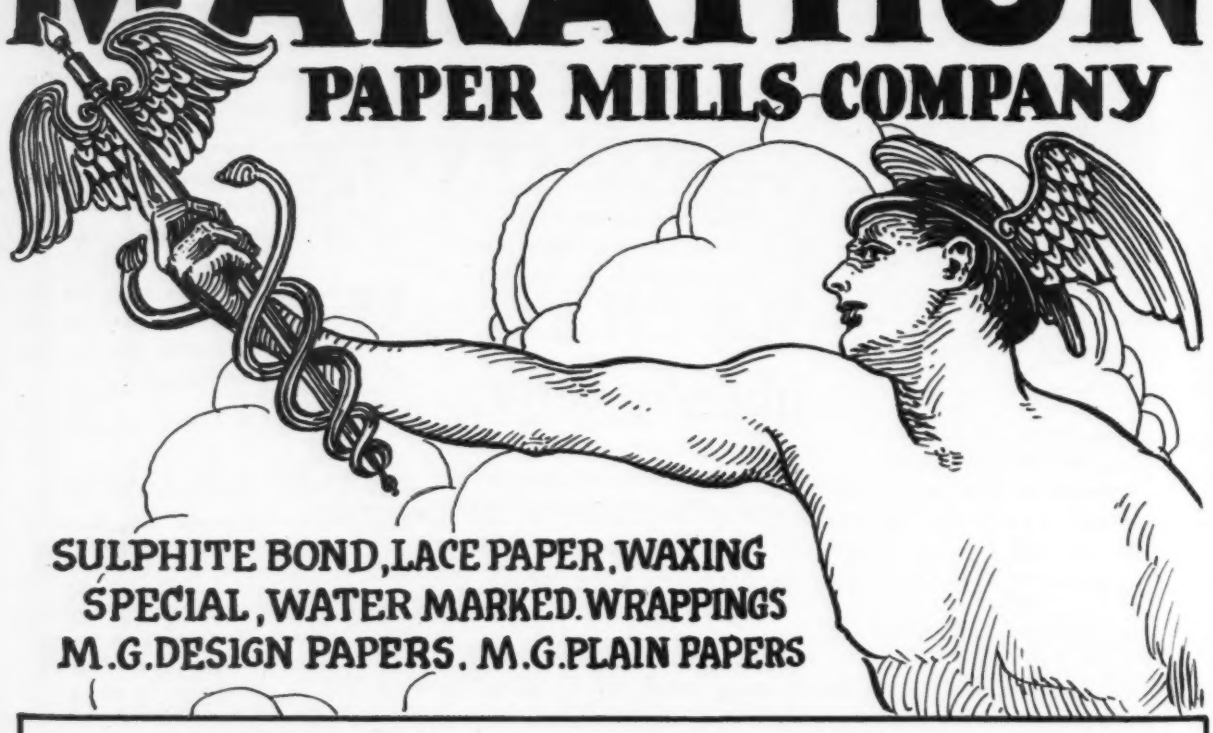

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Geo. W. Sisson, Jr., Racquette River Paper Co., Potsdam, N. Y.
E. G. Schmidt, International Paper Co., Chicago, Ill.
F. T. E. Sisson, Racquette River Paper Co., Potsdam, N. Y.
Lewis H. Sisson, Racquette River Paper Co., Cincinnati, O.
F. Henry Savage, International Paper Co., Boston, Mass.
E. C. Smith, Nashua Gummed & Coated Paper Co., Nashua, N. H.
H. H. Schoen, The Barrett Co., New York City.
R. C. Servaas, Bryant Paper Co., Kalamazoo, Mich.

T

J. B. Thayer, U. S. Envelope Co., Worcester, Mass.
James Thompson, U. S. Envelope Co., Worcester, Mass.
E. C. Tucker, Chemical Paper Mfg. Co., Holyoke, Mass.
C. P. Thorne, Riordon Pulp Corp., Montreal, Can.
T. A. and P. M. Tallon, Hummill-Ross Fibre Corp., Hopewell, Va.
D. E. Towne, Watob Paper Co., Sartell, Minn.
E. F. Troop, P. H. Glatfelder Paper Co., Spring Grove, Pa.

U

S. A. Upham, Brownville Paper Co., Brownville, N. Y.
Charles Upson, The Upson Co., Lockport, N. Y.

V

John B. Van Horn, Holyoke Cord & Paper Co., Springfield, Mass.

W

Chas. F. Wadham, Z. & W. M. Crane, Inc., Dalton, Mass.
A. N. Waring, Bayless Mfg. Co., New York City.
S. L. Willson, American Writing Paper Co., Holyoke, Mass.
M. A. Wellington, Fletcher Paper Co., Alperia, Mich.
Wm. B. Wheelwright, District of Columbia Paper Co., Washington, D. C.
Norman W. Wilson, Hammermill Paper Co., Erie, Pa.
F. P. Whitling, Howard Paper Co., Urbana, O.
G. E. Williamson, Strathmore Paper Co., Mittineague, Mass.
W. S. Wardle, Laurentide Co., Ltd.
A. H. Wilcox, Phoenix Paper Co., Battenville, N. Y.
T. C. Walsh, Hollingsworth & Vose Co., Boston.
Ellwood Wilson, Laurentide Paper Co., Quebec, Canada.
Sigmund Wang, Riordon Pulp Corp., Hawkesbury, Conn.
J. M. Ward, Detroit Sulphite Pulp & Paper Co., Detroitt, Mich.
Geo. A. Whiting, Whiting-Plover Paper Co., Stewart Point, Wis.
Fred Webster, American Writing Paper Co., Holyokee, Mass.
A. G. Wightman, Hawthorne Paper Co., Kalamazoo, Mich.

FOREST PROTECTION PROGRAM

The Provincial Cabinet has had meetings at Montreal during the week for the purpose of giving effect to the legislation passed at the last session for the reorganization of the forest protection services. While no appointment to the post of director of forest protection has yet been announced, all the necessary orders-in-council to allow the organization to go on have been passed and between now and April 15, Hon. Honore Mercier will have completed the necessary organization. The fact that the Government forest protection service will extend to all Crown lands and to colonization centres means that the staff of officials and forest rangers, who last year numbered 2,000, will exceed this figure considerably this season. The sections of the province where the service will be in operation have been subdivided. Fire protection apparatus is being provided for and when the director is appointed the preliminary organization will have been completed so that he will only have to put the machinery in movement. The limit holders have been meeting in Quebec this week to decide on their attitude in regard to the new services. Some of the limit holders have suggested that a commission for forest protection might be created with a representative of the Lands and Forest Department, who would be the director of the forest protection service, a representative of the limitholders and a third party representing the settlers. Regarding the choice of the director of the service, several names have been mentioned, including Henri Keifer, engineer, and Henri Methot, one of the forestry engineers attached to the Provincial Government air service in Roberval.

AMERICAN ENVELOPE BUREAU MEETS

A meeting of the American Bureau of Envelope Manufacturers was held at the Drake Hotel, Monday and Tuesday, March 31 and April 1. It was attended by representatives of some thirty-five producers of commercial envelopes in the United States. The meeting was a closed session, problems of production and distribution occupying most of the time. There were no set speeches. It was one of four meetings that are held each year by the organization. The next will probably take place in Minneapolis within three months. A buffet luncheon was held each noon in rooms adjoining the meeting parlors. Officers of the Bureau are: President, Eugene Harms, Hesse Envelope Company, St. Louis; vice-president, Walter Berkowitz, Berkowitz Envelope Company, Kansas City, Mo.; secretary-treasurer, C. R. Stevenson, 19 W. 44th street, New York City.

SEEK TO ELIMINATE FLOODS

The annual floods in the Fox and Wolf river valleys in Wisconsin which have caused riparians and mill owners no end of trouble, probably will be averted this year as the result of an agreement between the riparians, mill owners and the war department of the government to keep the level of Lake Winnebago, the reservoir of the valley, at a much lower level during the winter and early spring so it can absorb more water coming down from the north.

Arrangement has been made whereby waterpower and navigation is protected and at the same time a much larger quantity of water can be stored in the lake. It is believed that nearly all of the trouble will be avoided this year.

Riparians and mill owners also are co-operating in an effort to secure an appropriation of $25,000 from congress to make a survey for a drainage ditch which will carry off much of the floodwater before it reaches the lowlands where most of the damage is caused.

PATTEN CO. INCREASES STOCK

Capital stock of the Patten Paper Company, Appleton, Wis., was increased last week from $100,000 to $1,000,000 to take care of the expansion represented by purchase of absolute control of the Outagamic Paper Company, Kaukauna, Wis., by the Rosebush interests. Articles of incorporation for the Patten Company were amended last week to provide for the increase capitalization.

The Outagamie Paper Company continues in existence as a holding company of the Kaukauna property but the mill will be operated by the Patten Paper Company and will be part of that company's organization. The general offices have been moved from Kaukauna to Appleton, leaving only a few clerks to take care of shipments and mill details. A. C. Remley of the Rosebush organization is in active charge of the Kaukauna mill.

Mr. Rosebush said there were no announcements to make regarding changes at the Kaukauna mill. It will continue operating as it has in the past.

Mr. Rosebush, who owned the majority of the stock in the Outagamie Paper Co., purchased all the stock held by other stockholders, including A. W. Priest, president and one of the founders of the company. He also acquired all the stock in the waterpower company which owned the property on which the mill was located.

WOULD RESTRAIN WAX PAPER PLANT

There is now pending for adjudication before Judge Audenried in the Common Pleas Court No. 4, petition of property holders living adjacent to the wax paper manufacturing and converting plant of Louis J. Kolb, in Tacony street, in the Northeastern section of Philadelphia for an order restraining the defendant from continuing operation as at present conducted, on the allegation that "disturbing noises are produced by its machinery and flaming embers from the incinerating plant." Testimony was presented by the firm that the operations of the plant were properly conducted. Judge Audenried at the hearing held during the week observed "that if a drop of ink gets in your best shirt front it is ruined for the occasion—and it's the same way with the family wash if only a smudge hits the bed sheet the white cover is disfigured." However, determination of the issue was held in abeyance.

Williams Standard Paper Moisture Tester

An Accurate Moisture Test of Your Paper in Ten Minutes

Overdry paper loses you weight.
More breaks on machine. Kicks from customer.

"Your Testing Ovens have saved us thousands of dollars." Gen. Mgr. (name on request)

Recent single order from International Paper Co. was for SIX Paper Moisture Testers, based on previous orders.

Double-walled electric oven with thermostat control, accurate scales, with beam graduated to read per cent of moisture directly. No calculation required.

Tests all kinds of paper from tissue to board.

Accurate to .1 of 1%.

Write today for particulars.

WILLIAMS APPARATUS COMPANY

PARK PLACE, WATERTOWN, N. Y.

Making Paper From Stump Wood

Interesting Undertaking of Calcasieu Manufacturing Co. of Elizabeth, La., Which Has Just Constructed a Plant for the Manufacture of Kraft Wrapping Paper from Stumps, Knots and Waste Wood of Yellow Pine—Plant Is the Only One of Kind in Existence and Operates Under Special Processes in the Treatment of the Wood—Making of a Standard Chip One of Company's Accomplishments.

The lumber interests in the South who own large tracts of cut-over longleaf yellow pine land and paper manufacturers in the North will be interested in the development of the Calcasieu Manufacturing Company of Elizabeth, Louisiana, which is just getting into operation. This company has finished constructing a plant for the manufacture of kraft wrapping paper from the stumps, knots and waste wood of the yellow pine after the extraction of the turpentine and rosin.

There is no other plant of its kind in existence. By new methods and by wide changes in old ones, by special processes in the treatment of the wood, this company takes the old stumps from the cut-over land and after extraction of the wood converts it into high grade wrapping paper. This is a development brought about by J. F. Carter, a chemical engineer, who has worked long to find some practicable method by which this conversion could be carried out.

Having been through all the destructive distillation, steam distillation and solvent processes, having rung all the changes in them and having made many exhaustive tests in laboratory apparatus and in large plant-size digesters, Mr. Carter has finally worked out a series of methods, or a procedure, by which all the problems were solved.

Problems to Be Solved

The problems were to get a turpentine which could never be called "wood turpentine," to get all the rosin out of the wood in a condition to be marketed, to get rid of the charcoal or charred wood which comes on all stumps as a result of wood fires, to get rid of the rotted wood and the bark, to free the product of the pebbles, sand and dirt carried by the roots when the stump is taken from the ground, to get a standard chip which would give the largest amount of pulp from a given weight of wood, to have little uncooked wood and to have few uncooked knots in the pulp when blown from the digester, and to recover the largest percentage of the chemicals used in the process.

By one special piece of equipment all the charcoal, sand, dirt, rotten wood and bark is removed and by another the standard chip is produced; by special procedure in cooking the wood, the water-white turpentine is produced, rosin is removed, and the time of cooking into pulp is cut short. In the recovery plant the chemicals are recovered to a very large degree, and research work is being carried on in a specially arranged laboratory to make a still greater recovery possible.

The chemical process is not the "sulphate" which it has always been understood is the only process for making paper pulp from yellow pine and the odors which are so apparent in other sulphate pulp mills in the South are not known at this plant.

Carter Process in Use

It has been almost three years since Mr. Carter took up the use of his process with the Industrial Lumber Company at Elizabeth, La., where it was installing a canning plant, having already a sweet potato curing plant and an ice plant in operation, and was operating two demonstration farms. Residents of the town were also operating a destructive distillation plant and were gathering the pine knots from the lands.

The officers of the lumber company, who had operated a steam distillation plant behind their boiler house for almost 10 years, extracting turpentine from the hogged waste wood before it was passed to the fuel house, were interested in the process. It had, several years previously, been interested to some extent in a paper plant at Braithwaite, Louisiana, and had supplied some of the wood to that plant. When they asked for proof of the process, a laboratory demonstration was given but although it worked successfully, it was regarded, as many people look upon laboratory tests, as not sufficient for an investment running into hundreds of thousands of dollars. Consequently, the sum of $20,000 was set aside for tests on a plant size scale; and thereafter all tests were made by cooking six tons of wood at a time. These cooks having shown that the process worked on every kind of pine stump wood and knots, a paper company was organized, the Calcasieu Manufacturing Company of which R. M. Hallowell is President; S. M. Lee, Vice-President and General Manager; J. F. Carter, Secretary and General Superintendent; O. A. Trorlicht, Superintendent of the pulp mill, and B. F. Smith, Treasurer.

Operated By Electric Motors

The entire plant is operated by individual electric motors with the exception of the variable part of the Beloit Fourdrinier paper machine, which is operated by a steam engine. The electric current is purchased from the plant of the Industrial Lumber Company, while the Calcasieu Manufacturing Company has its own steam plant for cooking the pulp, to drive the paper machine engine, to operate the recovery room and for general heating purposes. One of the improvements is the specially designed superheater through which the steam passes. This superheater is not located in the boiler installation, but is individually fired and heats the steam to a final temperature of 800 degrees Fahr.

The first stumps brought into the plant come from a special job of clearing being done. This is a development for a 1,000-acre pecan grove which is now being planted. As the stumps were blown from the land, they were hauled to the plant and stacked in the woodyard for use in making paper. This pile of stumps would cause a gasp of surprise to any pulp-maker accustomed to using only green timber, clear of knots, neatly piled. The stumps are gnarled, knotty, rich in resin, covered with charcoal, sand and dirt, with here and there great patches of rotten wood or bark. The pile doesn't cause any uneasiness, but on the contrary is regarded as excellent wood although any other pulpmaker would throw the wood under the boilers or otherwise get rid of it.

The research laboratory is fitted with the best appliances for carrying out further tests, for the officers of the company will not be satisfied until they have produced the very best paper that can

Vo

Here's to Your Health!

Here is an article which every paper dealer in the land can handle to advantage and profit.

For there's cleanliness, health and safety in these dainty, individual Vortex Paper Cups that makes particular people everywhere prefer them—and careful customers demand them.

Every factory—every office—every place where water is dispensed—is a live prospect. The old-fashioned drinking glass, with its lurking place for germs, is fast giving way to this sanitary drinking water service.

Vortex Drinking Cups are made from a superior grade of bleached sulphite paper, thoroughly saturated with fully refined paraffin wax of the character and quality used in the preservation of food products. They are absolutely tasteless and odorless. The temperature at which the paper is waxed lends a thoroughly sterilizing effect.

rtex

Sanitary Drinking Cups

Most food products purchased in the market are wrapped in waxed paper such as is used in the manufacture of *Vortex Drinking Cups*. Incidentally, this method of treatment meets the requirements of the Pure Food Act, as well as existing State, Federal and local regulations.

Vortex Drinking Cups are compact, clean, dainty and sanitary; they are rigid, substantial and efficient; will not collapse in use, and are waterproof for 24 hours.

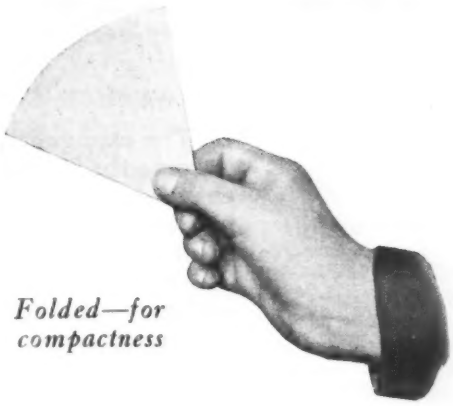
Their low cost feature assures a ready market everywhere.

Made in two styles—the cone-shaped, non-collapsible, shown on left hand page—the folding style, shown on this page. Vendors for each style also illustrated.

Big business and profits await paper dealers who handle Vortex Cups. Write for prices and samples.

Display at Booth No. 78, Paper Products Section, Paper Industries Exposition, Grand Central Palace, Week of April 7

THE VORTEX MFG. COMPANY,
421-431 N. Western Avenue,
Chicago, Ill.



Folded—for compactness

Open—ready for use

Easy to Handle. Capacity of Vendor 250 Cups.

Announcing
A Change of Sales Policy

The Cycloidal Vacuum Pumps, which have previously been sold to the paper and pulp mills through a sales agent only, may now be obtained directly from the manufacturer—The Connersville Blower Company.

The change in sales policy will enable this company to serve the industry more closely with information and experience from more than thirty years of pump and blower manufacture. For the further convenience of these companies whose offices are in New York or Chicago, or the territory immediately surrounding either city, branch sales offices are maintained in each by this company.

Connersville Cycloidal Vacuum Pumps have during the last fifteen years, been installed in many paper and pulp mills enabling the operator of these plants to become familiar with their simple, sturdy construction and economical operation on suction rolls, flat boxes or drying systems. Further information concerning design and capacities is available in Bulletin 20A.

The Connersville Blower Company

Mount Street and Michigan Avenue

Connersville, Indiana

Branch Sales Offices

53 W. Jackson Blvd.
Chicago

114 Liberty Street
New York

Connersville

be made and until they have produced the greatest value from the thousands of pounds of rosin extracted each day from the stumps. It may be remarked that the rosin is not produced as hard rosin, and will not be marketed in that form. Knowing that hard rosin is merely a raw material for other higher-grade products, such as rosin oils, soap stock, papermakers' size, also paint and varnish driers, the proposal is to produce them.

Turpentine Water White

The turpentine is surprising in that it comes from the digester water white, without need for further refining; it has no tarry odor, and is not in the class of "wood turpentine." In fact, the general superintendent states most emphatically that it is one grade higher than gum spirits, in that gum spirits must be refined to rid it of rosin acid of which this turpentine is free. Its odor is not as strong as the pure gum spirits which comes from the tree by the old tapping methods.

Making a Standard Chip

The making of a standard chip is part of the process pointed to with pride by the company. This allows of the cooking of all parts of the chip at one time without under or overcooking. And this, in turn, means greater production of pulp per ton of wood.

The owners of cut-over lands in the South and the manufacturers of coarse papers in the northern states will watch the operation of this plant with great interest. When perfected in its operation it will be the solution of a problem which has caused much thought and into the attempted solution of which there have been sunk many millions of dollars in the course of the last score of years.

WANT HIGHER DUTY ON WRITING PAPER

It is understood that Charles C. Davis, vice-president of the Eaton, Crane & Pike Company of Pittsfield, Mass., M. W. Byers, secretary of the National Association of stationers and manufacturers, New York, and Representative Treadway of Massachusetts, called at the Tariff Commission to discuss informally with officials of the commission competition of German and Austrian boxed writing papers, in the United States. It is understood that the paper men told the commission that the price at which these foreign writing papers are being sold in the United States cannot be met by American manufacturers. It is possible, it is believed, that the manufacturers may file an application with the commission for an increase in duty in paragraph 1307 and 1308 of the Tariff Act.

RECEIVER'S SALE OF DOTY & SCRIMGEOUR

Disposition of the plant of the Doty & Scrimgeour Company, at Reading, Pa., was made through a Receiver's sale during the week when the property changed hands. Clinton E. Woods of Philadelphia bought the plant for $35,000, plus the obligations, making a total price of $50,000. He will operate the plant along the same lines as previously conducted. Under the former ownership the firm conducted a surface coated paper business and featured friction glazed, flint glazed, and plated in colors and white and noncurling papers for press work, also waterproof coatings.

OLDEST EMPLOYEE RESIGNS

James J. Murray, for 15 years associated with the Kalamazoo Stationery Company and allied organizations such as the Educational Tablet Company and the B. Hopper Company, has resigned his position as sales manager. He is the oldest employe from the standpoint of uninterrupted service with those interests. He will sever his connections in the near future. While his plans are not announced, it is understood he intends to remain in Kalamazoo. For the past year Mr. Murray has been general sales manager of the Kalamazoo Stationery Company.

AMERICAN WRITING CHANGES

Important changes in the official personnel of the American Writing Paper Company at the Windsor Division of the Company at Windsor Locks, Conn., have been announced by President S. L. Willson.

J. E. Hevin, who as structural engineer has been in charge of the several important changes and remodelling of the plant for the past few years has resigned to take a position with the paper mill owned by the Chicago Tribune at Tonawanda, N. Y. His work at the Windsor Division is about concluded. M. K. McKenna who has been assistant superintendent of the mill, has been promoted to take Mr. Hevins's place. Mr. McKenna is a native of Windsor Locks and learned the fundamentals of the business with C. H. Dexter's Sons' mill starting in 1911. He was made assistant superintendent of the Windsor Division in 1917.

John P. Kennedy, who has been assistant for General Superintendents Yoerg and Nixon, has been appointed manager of the Windsor Division, being one of the youngest mill managers in this part of the country. He graduated from the Holyoke High School in 1913 and after holding several positions became secretary to George A. Galliver, then president of the company. At his own request he was transferred to the manufacturing end of the business and in 1913 was sent to Windsor Locks to assist in the revamping of the property there.

J. W. VAN ALSTYNE IN VANCOUVER

John W. Van Alstyne, who has had 29 years' experience in paper making, arrived in Vancouver, Wash., on March 29, to take charge of the sulphite end of the Columbia River Paper Mill Company. For 14 years he was with the Rhinelander Paper Company, of Wisconsin, where he specialized in making glassine and waxine papers. He was with the Kimberly & Clark Company, largest manufacturers of book paper in the United States, for 11 years. He was also connected with the Peshtigo Paper Company at Peshtigo, Wis.; with the Arrowhead company at Fulton, N. Y.; and for a year was in New Brunswick with one of the largest paper-making companies of Canada.

"The flattering reports of Clarke county and the prospects here, sent me by Superintendent Fuller, induced me to come," Mr. Van Alstyne said immediately after his arrival. He came here from Appleton, Wis., and will take up his duties tomorrow.

"We expect to be making paper by July," Superintendent Fuller said.

WOOD PULP MILLS OF EASTERN U. S.

On pages 116 and 117 of this issue is printed a very interesting map greatly reduced, published by the New England Paper and Pulp Traffic Association showing the wood pulp mills of the Eastern United States and Canada. The map gives the location, daily production capacity, kind of pulp and if any excess is available for the market. The data has been compiled from Lockwood's Directory of the Paper Trade edition of 1923, as well as data obtained from special investigation by the association. While the map was prepared for the special use of members a few copies are available and may be obtained at $7.50 each by addressing the association at Boston.

CORRUGATED CO. CHANGES TITLE

The Crescent Corrugated Paper Products Company, 5th and Noble streets, Philadelphia, is now conducting business as the Crescent Box Corporation, the name having been changed for the purpose of giving clearer characterization to the type of its production. The firm is engaged in the manufacture of corrugated paper and corrugated and folding boxes and recently added much new equipment of its own special patent and of standard machinery for the purpose of increasing production.

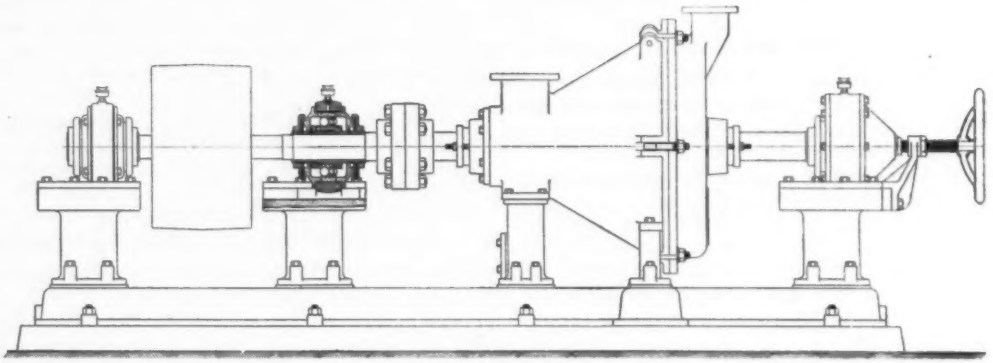
The Hermann Manufacturing Company

Manufacturers of

Claflin Refining Engines

Lancaster, Ohio

Canadian Fairbanks-Morse Co., Ltd., Canadian Agents



PRODUCTS:

The improved Claflin Continuous Beater and Refiner.

The CLAFLIN is superior on account of greater production, ECONOMY in operation, making stronger, finer and more uniform pulp.

A complete unit will handle the hardest kind of stock direct from the cooker and refine it for the Paper Machine without any regular beating engines. Claflins save on original cost of installation, power consumed and repairs.

They are super-excellent for Kraft Paper, Sulphite Screenings, Wall Board, Rope Manilla, Leather Board and waste from pulp stones. A 25 to 50% time saving results when used in connection with tub beaters.

GENERAL SPECIFICATIONS

Sizes: Claflins are built in two sizes, either belt or motor driven. The No. 1 is the smallest machine used for ordinary work. The No. 2 is our heavy duty machine.

Floor Space: The No. 1 belt driven requires 4′ x 11′ floor space. The No. 2, 5′ x 14′ floor space. Motor driven machines are about 3′ shorter.

Horse Power: This will vary on different stock, but the average for the No. 1 is 60 H.P., and the No. 2, 100 H.P.

Speed: The speed of the No. 1 is 450 R.P.M.; of the No. 2, 400 R.P.M.

Capacity: The capacity of the No. 1 is from 20 to 25 tons per 24 hours; of the No. 2, 30 to 45 tons per 24 hours.

Driving Pulley: The standard pulley for No. 1 is 26″ dia. x 16″ face; for the No. 2, 36″ dia. x 20″ face.

Bearings: The latest model Claflin is full ball bearing equipped. This holds the plug central at all times with the shell knives and produces a more uniform pulp with consequent uniform wear on knives.

Inlet and Outlet: The No. 1 has a 6″ Inlet and 6″ Outlet; the No. 2, 8″ Inlet and 8″ Outlet.

Knives and the Arrangement of Filling: Our standard knife in plug and shell is ½″ thick, made from special alloy steel which will not break or tear out. Knives in plug and shell are set at an angle of 10 degrees with center line, but in opposite directions so that they cross each other when machine is running, which is the reason that CLAFLINS are superior in brushing and beating action.

We are prepared to furnish knives of ¼″, ⅜″ and ¾″ thickness to suit special conditions. We are prepared to furnish cast manganese linings of ½″ knife thickness for both plug and shell.

Refilling: CLAFLINS are quickly and easily refilled by any mechanic.

A cast iron plug is keyed permanently on the shaft. A shell with knives cast solidly in place is slipped over this plug and fastened securely by a taper pin. The shell knives are easily put in place and backed up with wood filler.

The ball bearings are never disturbed when filling either plug or shell as they are fastened to shaft by means of a taper sleeve which can easily be loosened and taken off.

New Machine of Burrows Paper Corp.

Ninety-six Inch Harper Fourdrinier Paper Making Machine Constructed by The Bagley & Sewall Co. Was Recently Set in Operation at the The Burrows Plant—Considered by Experts as the Last Word in a Tissue Paper Machine—Concern's Production Now Increased Approximately One-Third—Speed of 600 Feet Per Minute Possible and Production Capacity Is from Eight to Ten Tons in 24 Hours.

Written Especially for the Annual Number of the Paper Trade Journal

The Bagley & Sewall Company of Watertown, N. Y. recently completed for The Burrows Paper Corporation of Little Falls, N. Y., a 96-inch Harper Fourdrinier paper-making machine which because of the many improvements suggested by experienced paper mill men is considered the last word in a tissue paper machine. The two new machines will enable the concern to increase its production approximately one-third. This machine occupies a space 20 feet wide, 81 feet in length and 13 feet in height. It weighs 90 tons and it requires six cars to transport it.

Speed of 600 Feet Per Minute

The machine is designed to run at a lineal speed of 600 feet per minute and, at this speed, will produce from eight to ten tons of tissue paper in 24 hours, the output depending on the weight of the paper and the quality required.

A general outline description of the various parts of the machine follows:—

The Harper Fourdrinier part has a wire 96 inches wide by 40 feet long. It is not fitted with a shaking arrangement. The breast roll is bronze cased, is 14 inches in diameter and is carried on ball bearings.

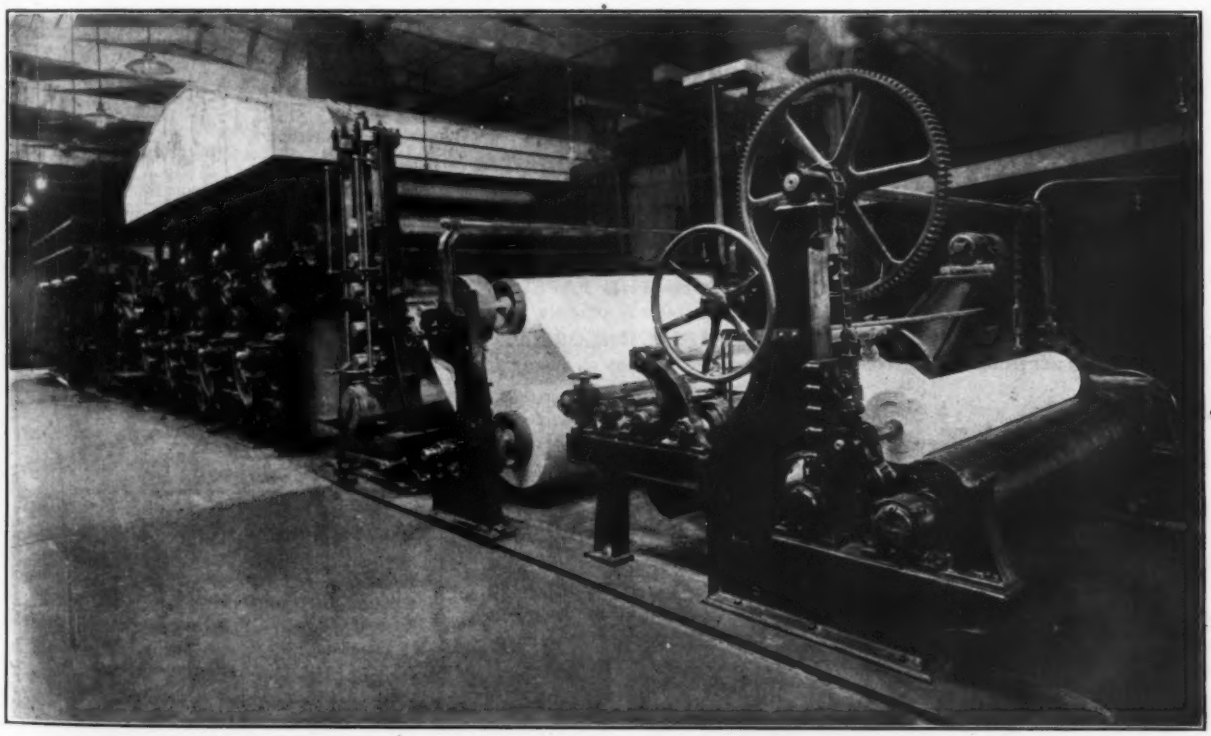
The table rolls are of seamless drawn brass tubing, five inches in diameter and are carried on ball bearings placed on top of the side-bars. The wire-carrying rolls are of seamless drawn brass tubing, seven inches in diameter and carried on ball bearings.

Bottom Couch Roll of Bronze

The bottom couch roll is bronze cased. It is 24 inches in diameter and the face of the roll is grooved both circumferentially and longitudinally. The top couch roll is rubber covered and is 18 inches in diameter.

There are two brass suction boxes on the wire part. The Deckle has two brass slices and wash-boxes. The deckle straps are two inches square.

There is one set of presses. The top and bottom press rolls are each 18 inches in diameter, rubber-covered and are one inch thick. The press felt rolls are also rubber-covered and are carried on ball bearings. The Harper felt is 83 feet long.



BAGLEY & SEWALL HARPER FOURDRINIER RECENTLY INSTALLED BY THE BURROWS PAPER CORP.

READY FOR DELIVERY

THE 1924—49th ANNUAL—EDITION OF

LOCKWOOD'S DIRECTORY

PAPER, STATIONERY AND ALLIED TRADES

PRICE $7.50 (OR $7.00 CASH WITH ORDER) INCLUDING DELIVERY CHARGES

Has been thoroughly revised and brought up-to-date and entirely reset this year with new type.

SPECIAL TRAVELERS' EDITION.—A limited number of copies, pocket size, for use of traveling men, taking in the Mill Section, which comprises the Paper and Pulp Mills, the Coating Mills and the Mill Officials. These copies are bound in soft flexible cloth binding.

Price $7.50, including delivery charges ($7.00 cash with order).

CONTENTS

PAPER AND PULP MILLS

All the Paper, Wood Pulp and Chemical Fibre Mills in the United States, Canada, Cuba, Mexico and South America, geographically arranged, with the names of officers; a complete statement of mill equipment; kind of power used, product of mills, and total production per 24 hours.

MILLS CLASSIFIED ACCORDING TO PRODUCTS

All the mills making the same kinds of paper, boards or pulp are brought together under headings descriptive of their products.

PAPER STOCK AND RAGS CONSUMED BY THE MILLS. (NEW SECTION THIS YEAR)

Gives a list of the grades of paper stock and rags consumed by each of the more important mills in the United States and Canada, together with the names of the purchasing agents of these materials.

MAKERS OF PAPER SPECIALTIES

Giving the names of concerns that convert paper to special purposes.

PAPER DEALERS

Wholesale paper houses with indicating marks telling whether the business is done through stores or from warehouse or mill direct; large concerns selling paper as a side line are also included.

PULP, RAG AND PAPER STOCK DEALERS

Names of houses dealing in rags, old papers, pulp, etc., including importers.

CONVERTERS OF PAPER

Included under this heading are those concerns that turn out the following products: Glazed Papers, Coated Papers and Boards, Waxed and Parchment Papers, Toilet Papers, Saturators of Roofing Stock, Paper Bags, Paper Boxes, Envelopes, Pads and Tablets, Tags, Wallpapers, etc.; also a list of Twine Manufacturers.

WHOLESALE AND RETAIL STATIONERS

Leading Stationers and others handling stationery in the United States, Canada, Cuba, Porto Rico and the Philippine Islands. The list printed is considered the most complete and most accurate published.

WATERMARKS AND BRANDS

All the leading titles used in the American Paper Trade are included.

WHO'S WHO IN THE PAPER INDUSTRY

This list includes all the prominent mill officials, together with their connections.

TRADE ASSOCIATIONS, STATISTICAL INFORMATION AND ADVERTISEMENTS

the latter comprising a most complete guide to the sources of supply for machinery and Raw Materials used in the industry.

PUBLISHED BY

Lockwood Trade Journal Co., Inc., 10 E. 39th St., New York

LOCKWOOD TRADE JOURNAL CO., Inc.

10 East 39th Street

Send, delivery charges prepaid, a copy of the 1924 (49th) Annual Edition of Lockwood's Directory of the Paper, Stationery and Allied Trades. Price $7.50 ($7.00 cash with order).

Check which edition you want: *Name* .....

☐ Regular Edition.

☐ Travelers' Edition.

Address .....

.....192 .....

There are two suction boxes on this felt. The paper is passed automatically from the press rolls to the dryers by a pick-up felt which is 40 feet long. There is one receiving dryer, 36 inches in diameter and eight dryers 48 inches in diameter by 96-inch face. The dryer bearings are bronze lined and self-oiling.

Fitted with Spur Gears

The dryers are fitted with cut spur gears and the dryer felt rolls are carried on ball bearings.

There is a stack of six chilled iron calendar rolls, each roll fitted with a doctor and automatic feed. There is a two-drum stack reel which has drums 16 inches in diameter. A one two-drum winder with drums 16 inches in diameter is combined with a slitting machine.

The floor cone drives are of the Marshall type with taper cone pulleys, mortise bevel gears and machine-cut pinions and friction clutches, all mounted on rigid self-contained bases, with ring-oiling bearings.

The line shafting is carried on ball bearings and the machine is driven by a 60-horsepower variable speed electric motor. The return water pump, suction pump, stock pump and Jordan are each driven by separate speed electric motors.

This machine was erected in the mill by W. D. Carnes and Harry Purdy, both of whom have long been in the employ of the Bagley & Sewall Company, and both of whom have installed machines in many of the largest mills in the United States and Canada as well as mills in several foreign countries.

Recent Changes at Burrows Plant

At the beginning of 1923 the Burrows plant had two 84-inch machines. In March one of these was replaced with a 90-inch Bagley & Sewall Cylinder machine. In December the other old machine was replaced with the new 96-inch Bagley & Sewall Harper Fourdrinier which was started up on February 1.

PAPER DEMAND SLOW IN TORONTO

The business done by the jobbing paper trade in Toronto in March was rather lower than in each of the two preceding months, as March, 1923, was a record one in the trade last spring. For some reason the turnover during the past month did not come up to expectations, although January and February were ahead of a year ago with most wholesalers. However, business is expected to pick up somewhat during April and already there is a slight improvement. Jobbers report that the uncertainty over the proposed changes in the tariff and the probable amendment of the new Federal sales tax has resulted in orders being held back. Until the budget at Ottawa is brought down and some definite announcement regarding customs duty and the sales tax are made known, there will be hesitancy on the part of larger buyers.

Prices are holding firm in most lines of paper. Coated paper mills are still rather quiet as purchasers are buying more supercalendered stock to take the place of the coated commodity, at a considerably less figure. Envelope manufacturers are busier and manufacturing stationers have been rushed with Easter business which, owing to the lateness of the holiday this year and the fine weather prevailing, should result in a bigger trade than usual.

Foreign competition is interfering with the sales of such lines as greaseproof, tissue and vegetable parchment papers, in some instances the finished article being laid down for less money than the stock itself costs Canadian producers. Toilet mills are well employed at present and the outlook is good. Board plants are running nearly to capacity but paper box factories, except those making special holiday and fancy lines, are by no means rushed and have been turning out reserve stock lines in order to keep their organization together as much as possible. As there is abundant water supply now with all pulp mills, no great call for the finished article exists. Other lines are moving in about the same proportion as for several weeks past.

Trade-Marks Department

CONDUCTED BY NATIONAL TRADE-MARK CO., WASHINGTON, D. C.

The following are trade-mark applications pertinent to the paper field pending in the United States Patent Office, which have been passed for publication and are in line for early registration unless opposition is filed promptly. For further information address National Trade-Mark Company, Barrister Bldg., Washington, D. C., trade-mark specialists. As an additional service feature to its readers, PAPER TRADE JOURNAL gladly offers to them an advance search free of charge on any mark they may contemplate adopting or registering.

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BLUE RIDGE—No. 190,862. Wortendyke Manufacturing Company, Richmond, Va. For toilet paper and paper towels.

APARTMENT—No. 191,030. National Paper Products Company, San Francisco, Calif. For toilet tissue paper.

GOLDEN—No. 191,031. National Paper Products Company, San Francisco, Cal. For toilet paper.

TITE LITE—No. 190,766. Capital Paper Company, Indianapolis, Ind. For wrapping paper.

WHITE DAISY—No. 190,847. Charles C. Muir, Milwaukee, Wis. For toilet paper.

ETERNAL—No. 189,651. J. J. White Paper Company, Canton, Mass. For waterproof building paper.

MARIGOLD—No. 186,345. Wortendyke Manufacturing Company, Richmond, Va. For toilet paper, towels and napkins made of paper.

CADMUS—No. 187,466. John H. W. Jones, New York City. For paper.

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COLLEGIAN—No. 191,557. National Paper Products Company, San Francisco, Cal.

GOBLIN—No. 191,558. National Paper Products Company, San Francisco, Cal.

SOUTHLAND—No. 191,560. National Paper Products Company, San Francisco, Cal.

A CORRECTION

In the issue of the PAPER TRADE JOURNAL of March 27, 1924, under the heading of "Holyoke News of the Industry," it was erroneously stated that "J. Bertram Newton left last week to take up the duties of his new position as the general manager for the Chillicothe mill of the Mead Pulp and Paper Company."

Mr. Newton has become connected with the Mead Pulp and Paper Company but not in the capacity stated in the article.

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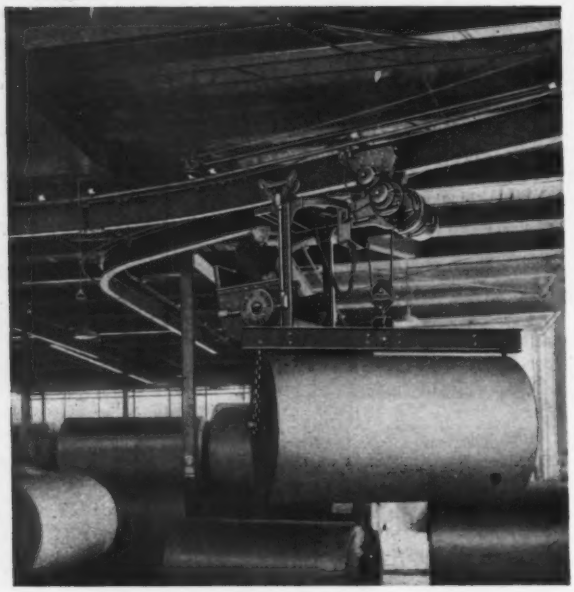

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First Steps in Cost Accounting in Trade Associations*

By Thomas J. Burke, C. A., Secretary-Treasurer, Cost Association of the Paper Industry.

Arousing interest on the part of members of a Trade Association is not so difficult as the keeping of their interest after it has been aroused, viz., after the first enthusiasm has worn off. This must be borne in mind when the first steps are being taken to arouse interest.

In particular, those responsible for bringing before the members of an association the advantages to be derived from the installation of proper cost estimating and cost finding methods, should be careful not to overstate these advantages. They should not attempt to bring the interest to a "boiling point" too soon. In my opinion, it is much better to talk separately to as many members as possible and let their enthusiasm grow gradually. It is really a problem in salesmanship. A particular problem, one that requires very careful handling, because the advantages do not become apparent, and therefore are not realized very quickly. It is very difficult to go back and tell a man who has been oversold —that he is expecting too much, too soon, and that in cost accounting "Blessed is he that expecteth nothing"—for at least a year, let us say.

Therefore, my advice to trade associations wishing to go ahead with cost work, is to go slowly but surely. To go surely they must have expert advice. The expert who should be retained, should report to a Cost Committee appointed by the Association. The Cost Committee will stress the practical side as against his theory. That has been the trouble with quite a few cost systems drawn up for Trade Associations, by professional accountants—they have been too theoretical, and no amount of selling could "put them over."

Cost accounting systems drawn up for Trade Associations must be practical—that, of course, is axiomatic.

The next step taken to arouse interest, should be a conservative statement of the advantages that will accrue to the members if they adopt the system. You will note that I believe that a system should be drawn up as soon as sufficient funds are available, by an expert working under a Cost Committee. Then the sales resistance will not be so great when the committee has something definite—the Cost System—to sell, instead of the idea of having a Cost System. This is the time when a little more pressure should be exerted by meetings, or if possible, by special visits to "get in some more members." This requires great tact on the part of the cost expert, particularly.

That brings me to another point. We have found it advisable not to talk too much about "uniform" cost systems. We prefer to talk of "correct" cost methods. We prefer this, because we have found many mills who have pretty good cost systems do some things in slightly different ways, and you would be surprised how much friction you can stir up by suggesting one or both should make changes, so as to be in line. It is better to let them go along in their own way, as long as you know their methods are reasonably correct, until such time as the industry has reached a point where a sufficient number of mills have got in line, so as to make possible a comparison of costs. Until this time arrives, I believe it is better not to do anything to antagonize anybody. Keep your powder dry. You will make much more progress by getting the most backward members in cost matters to install correct methods, than you will by getting the leaders to think exactly alike, until the time is ripe for the attempt to be made.

Definite Objection Raised

We have found a very definite objection on the part of many executives, who are "sold" on the necessity for having cost systems, to adopting a "uniform" cost system. Some of them have the idea

IMPORTANT NOTICE

COST CONVENTION

The Cost Association of the Paper Industry will hold its next convention at Erie, Pa., *on May* 19, 20 *and* 21, and a program has been arranged by strong committees, that will prove profitable to all attending.

Your attention is particularly drawn to the date of this Convention, because executives and their accountants interested in cutting down costs and increasing profits, should be present and are extended a cordial invitation to attend, irrespective of whether they are members of the Cost Association or not.

Tax matters will receive a place on the program, and, in view of the fact that Section 201 of the Revenue Act of 1924 proposes a serious and far-reaching departure from the principle of non-taxation of distributions of surplus acquired *before March 1st*, 1913, which has consistently been followed to date in Federal Income Tax legislation, it is most important that tax matters should be fully discussed.

The Hammermill Paper Company extends a cordial invitation to all those attending the Convention to visit their mills.

*Address delivered at Cost Conference, held at Hotel Astor, New York City, on March 25, 1924, by Department of Manufacture, United States Chamber of Commerce.

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Paper Mill Operatives Should Weigh These Facts

HEAT in the bearings of a prime mover is a danger signal—not only for its effect on the operation of that particular engine, but for its more far-reaching effect on the operation of the entire mill.

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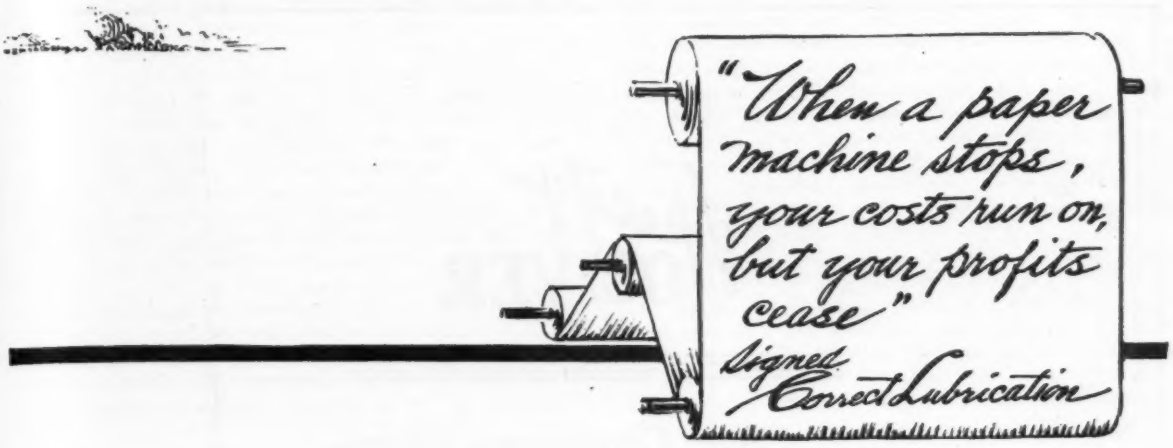

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If you are not already one of the many plants which profit by the Vacuum Oil Company's specialized counsel, we shall be glad to have an experienced man talk with you at your convenience. We suggest that you take this matter up with our nearest branch office.

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that the use of "uniform" cost systems means "uniform costs," that is, illegal costs instead of "uniform" methods of cost finding, and cost finding which, of course, are quite legal.

I chose to speak on the arousing of enthusiasm, for after some years' work, we are still in that phase of the work, but in my own defense I must say, that there are at least ten separate divisions in the paper industry, so the ground to be covered is extensive and some of it is very stony ground. The only way to get a crop from stony ground, is to keep on working it until success comes, or the impossibility of success has been proved.

We decided, therefore, to get out a publication called "A Budget Cost System for Paper Mills," which outlines what we consider fundamental to every good cost system. This publication does not attempt to go into all details, but does show how a set of cost entries should be made and how they tie up with the general books. That is one of our fundamentals, that the cost records tie up with the general books.

We have formed local committees in each paper making center, where regular monthly meetings are held. In addition, as Secretary-Treasurer of the Cost Association, I attend periodically meetings of the Trade Associations, when I report to the industries' executives on the work of the Cost Association, thus keeping our work and the importance of cost work generally, constantly before them. We hold two conventions annually, where the principles of cost accounting are discussed. Our next convention will be held at Erie, Pa., on May 19, 20 and 21. Any gentleman here present, who wishes to attend this convention, is heartily invited to do so. If they will give their names to Mr. McCullough, I shall be glad to see that they are all taken care of.

Fixed Assets Must Be Segregated

One point I wish to bring out very clearly is, that after all, the cost department is really only a section of the General Accounting Department. We have found it increasingly necessary to get away from the idea that you can graft a cost system on to any sort of a general accounting system. That's an important point. For instance, correct costs cannot be obtained unless the fixed assets are properly segregated and set up on the general books. I want to emphasize this very clearly, because I believe this is one of the reasons why as much progress has not been made by cost accountants as might have been made. To this day the older established accounting firms look upon cost work as a thing apart, while some of the firms specializing on cost installations look upon what is sometimes called "Higher Accounting," as a lot of high-brow stuff, which overlooks the most important department. We have heard from Mr. Jordan about co-operation, and other speakers, but as a final thought, I want to leave with you the necessity for close co-operation between the general accountants and the cost accountants, as well as the executives in the industry, if real progress is to be made. First catch your executive, then sell him, and by constant propaganda keep him sold. At the same time educate his general accountant to the necessity for co-operating with the Cost Department, also use every available means to assist the Cost Department in getting on to a proper basis.

I don't urge any particular way of doing this, only get it done. If the mill wants to do it themselves, help them as much as you can. On the other hand, if they want it in a hurry, help them to choose a good firm to do the work. There are not many it's true, so be careful here. But above all, don't let your members talk too much about the cost. I've heard some discussion about this today. It is in my humble opinion, impossible to talk about the cost of installing cost systems in such general terms as were used just now, that is, as a guide to others. You get back to the salesmanship idea—Sell this cost idea as you would go out to sell any other "hard seller." Go at it in a systematic, thorough manner, with the help of the enthusiasts. There are always a few of these. If, however, you hear a lot of talk about the cost of installation, you may rest assured your prospect has not been properly sold. You must sell him on "quality," not "price." If you have given him the right idea, $1,000 or $2,000 will not make any difference to him.

Differentiating Costs

Finally I must say, that one of the most important advantages to be gained by a proper cost system, is the differentiating of costs as between different grades, etc. This has already been touched on; however, I would like to add, that if the advantages to be gained, by being able to ascertain accurately the manufacturing costs of different grades, sizes, weights, etc., of similar products, instead of working on an "estimated" differential basis as is so often done, are properly brought out, they will undoubtedly induce many concerns to adopt cost-finding methods that will enable them to do this satisfactorily.

Cost Accountant and Industrial Disputes*

Many of the points at issue in Industrial Disputes commonly concern questions of what is the cost of producing certain manufactured goods, or the cost of rendering certain services. That the determination of this cost is primarily a scientific operation requiring the application of scientific principles has only been partly recognized. The increase in competition and the tendency towards the development of trade and commerce by means of large combinations have, however, influenced manufacturers and distributers to give more of their attention to the costing side of their undertakings. Thus a body of principles which will give reliable results has been steadily developed.

In cases where the question of cost only is in dispute, it would seem that the subject matter should normally be settled without the intervention of an Industrial Dispute. That this is often not so is shown by experience. Too frequently the real points at issue become so obscured by the admission of matter entirely foreign to the original ground of controversy, that the public and, in some cases, the disputants themselves are prevented from retaining a clear idea of what is involved.

But why should the question of "cost" ever form part of a trade dispute? Why is the question at the outset not referred to a scientifically trained Cost Accountant or a committee of Cost Accountants for decision or advice? There are several factors militating against this. In the first place, the science of costing has not yet received that full recognition in this country which must sooner or later be given to it. The precision and efficiency with which it works are not sufficiently appreciated, partly, no doubt, because in some undertakings "Costing" is in the hands of persons who have not grasped the fundamental principles upon which it is based, or the methods by which those principles must be applied. Naturally, the results obtained are misleading, and possibly the science of "Cost Accountancy" is condemned for results obtained by means which a scientifically trained Cost Accountant would not tolerate for a moment.

In the second place, it may be that one or both of the disputants may doubt the effect on his case of a detailed and impartial examination. Indeed, once the question of cost had been placed beyond contoversy, it would not infrequently happen that the subject matter of a dispute would entirely disappear. Human nature is not yet so perfect that some lack of clearness will occasionally not be unwelcome, but given a real desire to arrive at the true facts upon

* (From The Cost Accountant).

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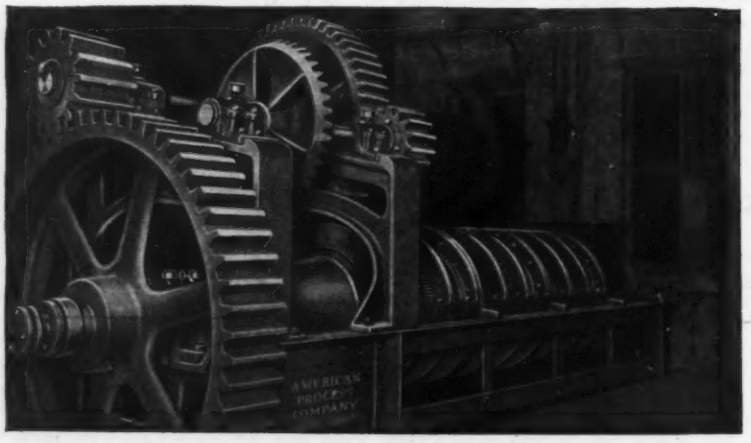

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which a decision which will do justice to all parties must be based, the importance of services which can be rendered by the scientifically trained Cost Accountant cannot be exaggerated.

The third reason for not calling in the Cost Accountant is an idea inherent in some minds that figures can be made to prove anything, and that consequently the expert Cost Accountant, from his superior training, is merely an expert who is in a better position than an untrained man to obtain such a result as is desired by those who avail themselves of his services.

Admitting the temptation to all parties to exhibit their case in the best possible light, the principles of scientific costing must necessarily be brought into play when all the figures are examined, as they should be, by independent committees of scientifically trained Cost Accountants.

The function of the Cost Accountant in the settlement of trade disputes must, of course, be limited to the determination of the question submitted to him. No doubt the real merits of a controversy are frequently lost sight of owing to the extremely technical nature of the work involved in the ascertaining of "costs." If, in the first instance, the ground could be cleared by reference to an independent Cost Accountant, or even to Cost Accountants representing each side in the dispute, other matters in controversy would be the more easily appreciated, not only by the public, but also by the parties directly concerned.

Federal Tax Board of Appeals*

By Frank Lowson.

The confidence of the taxpayers in the treasury department's administration of the bureau of internal revenue has been shaken by the recent discussions in the public prints and by erroneous adverse decisions by the commissioner of internal revenue, but notwithstanding these, the taxpayer's hope of getting a square deal has revived with the appearance of the Mellon bill which offers a new tax board of appeals. One construction that could be placed on that offer is that it is evident that the treasury department and the commissioner recognize the need for improvement in the administration of the income tax law. The country is fortunate in having as secretary of the treasury a man who has the courage to propose such a new board.

What the Mellon Bill Proposes

The Mellon bill proposes to have the board appointed by and responsible to the secretary of the treasury, but in no way under the commissioner of internal revenue, to sit as a semi-judicial board hearing both the taxpayer and the commissioner of internal revenue and to give an impartial judicial decision on the merits of the cases presented to it. On the other hand, several public organizations have proposed to the ways and means committee of the house that in order to give more impartial results, the proposed board of tax appeals should be divorced from the Treasury Department and should be appointed by the President with the consent of the Senate. Congress must decide which of these proposals is to be enacted into law.

It is desirable to restore the taxpayer's confidence. To do so it is necessary to provide such legal machinery as will, in the opinion of the taxpayer, give him a fair and impartial decision based solely on the merits of his tax case—as one witness before the ways and means committee expressed it, will give him "a fair run for his money."

Many Taxpayers Dissatisfied

Many taxpayers are dissatisfied with the decisions made against them by the commissioner. There can be no question that in many cases these decisions are wrong and that the taxpayer is justified in his dissatisfaction. Even in the cases where the taxpayers' dissatisfaction is not well founded, an impartial hearing is necessary to determine that fact. Furthermore, even in the case where a taxpayer's dissatisfaction is unreasonable, it is highly important, still, that a hearing be afforded him, because the Bureau of Internal Revenue is vitally interested in maintaining the confidence of taxpayers that they will get an impartial hearing. The Bureau of Internal Revenue is helpless, in spite of its great power, unless the rank and file of taxpayers have confidence in its fairness. The taxpayer will forgive the bureau more easily for being *wrong*, than for refusing to give a sufficient number of impartial hearings. That is, the public values fairness above accuracy. Both are important. If taxpayers are able to get an expeditious hearing from a judicial board, before which the government must be represented as they are represented—a board which does not combine the functions of judging and advocacy—he will feel better satisfied that he is getting a "fair run for his money." It is not necessary to create a new judicial board to pass on cases other than those adversely decided by the commissioner.

How the New Bill Is Unfair

The new bill is unwise insofar as it provides that opinions shall not be written unless a special rule is made to that effect. On the contrary, it should provide that unless the chairman certifies "in the particular case that it is against the interest of the government for an opinion to be written, an opinion shall be written in every case." This is necessary: (1) because otherwise the board might be making a serious mistake, which the interested party could discover in a few minutes and call to the attention of the board for immediate correction, and (2) because it is impossible to convince a litigant that a case is being fairly decided if the judge refuses to give the reasons for his decision.

As to (1) above, it is clear that a taxpayer cannot point ont a mistake in fact or theory, no matter how flagrant it is, unless he knows the ground on which the decision is reached, and he cannot do that without an opinion. As to (2) above, there is virtually a presumption in the mind of a taxpayer that a decision that will not stand publication is probably not correct. To decide a case right a judge must analyze it thoroughly in his mind. If he does that, it is no trouble to write an opinion. If a judge finds that the statement of his reasons for a decision is difficult, it means that he has not had sufficient training to qualify him for his work, or that he does not know the reasons himself.

Unbiased Board Desirable

The proposed secretary's board, being a part of the Treasury Department, cannot be unbiased as the proposed President's board, which will more nearly have the status and independence of a court. Regardless of the length of tenure of office, any member of the secretary's board could probably be removed on an investigation and order of the secretary. The members of the President's board, confirmed by the Senate, could not be removed by any such procedure.

Other points of difference might be raised, all should be raised now to assist Congress in deciding what would best meet the country's needs. The discussion should eliminate personalities. The present secretary of the Treasury would undoubtedly appoint the best man he could find. The President would do likewise.

A study of the tax simplification board report and the Mellon bill supplemented by conversation with at least four prominent officials of the Treasury Department, leads me to the conclusion that the Mellon bill contemplates the discontinuance of the present Com-

*From *Journal of Accountancy*.

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mittee on Appeals and Review and that the proposed board of tax appeals should take over the work of that committee.

Several Reasons

It is hoped that that will not be done for several reasons:

1. The period of 30 days allowed by the Mellon bill in which to appeal to the board from the commissioner's decision may be a sufficient time allowance to the taxpayer in which to contemplate such an appeal from a decision previously rendered by the Committee on Appeals and Review but it certainly *would not be sufficient time* to prepare and complete an appeal from a decision of the income tax unit to the board of tax appeals.

2. Conferences or discussions with the income tax unit do not in practice develop all the points of objection by the department and in many cases do not develop the essential points on which the case may ultimately be decided. The recent order by which the taxpayer received a copy of the unit's contentions, unsupported by argument or, references though they may be, gives the taxpayer an opportunity to prepare further to disprove the unit's supposed facts and arguments or contentions. And later, at the committee on Appeals and Review hearings further information and briefs have frequently to be filed, either at the hearings or following thereon to answer the committeemen's questions. Nothing should be done by the Mellon bill or the department under that bill to interfere with the foregoing process of developing the case and arguments. If that procedure is cut short or abolished it will be a serious detriment to the the taxpayer first, and to the government second. This is the opinion of a number of practical men.

3. The new board is to be as nearly equivalent to a court as possible. It should not be burdened with investigation work such as the present Committee on Appeals and Review must of necessity do. The new board should only have to decide the appeals on the cases rejected by the Committee on Appeals and Review. That would cut the board's work fifty per cent and enable it to much more expeditiously give leading and authoritative decisions on much that is wrong now. These leading and authoritative decisions must then be accepted by the commissioner's Committee on Appeals and Review or taken to court. If accepted the result will be a clearing of the tracks for the Committee on Appeals and Review and an increased production therefrom with similar beneficial reflex action on the income tax unit.

4. If the Committee on Appeals and Review is abolished and all its work transferred to the new board, that board will, in a short time, find itself relatively in as bad a position as the Committee on Appeals and Review is now with respect to volume of cases decided.

5. The main object to be accomplished by the new board is to restore the confidence of the taxpayer that he will get an impartial judicial hearing. That can best and quickest be done by submitting to the board only the cases decided adversely to the taxpayer by the committee.

How the Board Should Be Made Up

The membership of the new board should be made up of lawyers, accountants or economists, and practical business men, each class equally in proportion as nearly as may be.

CHARLES BELL RESIGNS FROM EDDY CORP.

Charles Bell, who accepted the position of general manager of the Eddy Paper Corporation's mills at Three Rivers and White Pigeon about a year ago, has been forced to resign, due to poor health. He will leave at once for Pinehurst, N. C. to recuperate. Before his departure mill employes gave him a handsome gold watch. This is the second serious breakdown Mr. Bell has had since coming to Michigan. He was granted one vacation and on recovery returned to his duties, only to be forced to give up work again.

CHANGES IN PHILADELPHIA PAPER MARKET

Conflicting currents in the coarse paper market mildly churned it up during the week and this, together with a gradually increasing demand by consumers, kept the distributors engaged in the wrapping business both interested and active. The fine paper men also, experienced a little liveliness because of better buying.

More changes in the coarse paper market developed during the past week than for some time past. There came almost an entire advance by Eastern Mills of No. 2 Krafts of a one-quarter cent. The price of No. 1 held steadily. Sheathing papers advanced generally about $2.50 per ton. The Board market, very much disturbed during recent weeks by heavy declines and more gradual recessions, was given another jolt during the week by proffers from a large local producer of chip at $2.50 per ton less than market. However, despite the slight advance on No. 2 Krafts it is reported that a number of local jobbers already are heavily overstocked and that they are trading among themselves on the basis of about 4½ cents sidewalk delivery.

Both the Bayless and the Continental Companies shaded down their screening fibers one-quarter cent and the former cut a quarter cent on its quotation of water finish butchers fibers. Grey bogus was rather weekly offered at 2¼ cents and tissues eased off ten cents a ream. Because of the very heavy but purely seasonal demand from the florist trade for waxed papers for the Easter season prices advanced slightly. This advance extended pretty well all along the line of waxed products.

Fine papers enjoyed during the week a little spurt attributed to filling of pre-Easter rush orders by the printers, but even discounting this the market showed continued improvement in tone. The stock market for both rag and paper remained rather quiet although not as somnolent as during the preceding week.

Paper stock quotations virtually were unchanged but all the rag line is selling at high figures even though a slight break appeared during the week.

BEMIS CO. HOLDS MANAGERS' CONFERENCE

The Bemis Brothers Bag Company, which has offices in twelve leading cities of the United States and Canada, as well as cotton and paper mills, held its annual managers' conference at the Drake Hotel, Chicago, from Wednesday to Saturday, March 26 to 29. This conference has been held in Chicago for the past ten years. It includes managers of all bag factories, cotton mills and the paper mill operated by the Bemis firm. Questions of production, transportation and distribution were the leading subjects discussed. The annual dinner took place at the Drake Hotel on Thursday evening, March 27. A. F. Bemis, president of the company, and J. S. Bemis, first vice-president, were in attendance. Managers present were:

G. N. Roberts, Boston; H. H. Allen, New York City; A. C. Carpenter, St. Louis, J. C. Skiff, New York City; W. G. Young, St. Louis; D. Belcher, Minneapolis; F. M. Ewer, Boston; J. B. Young, Bemis, Tenn.; C. A. Young, Indianapolis; Fred Young, Bemis, Tenn.; W. A. Lawson, Winnipeg; E. B. Roberts, Peoria; W. J. Monaghan, Omaha; W. H. Simmons, Indianapolis; R. D. McAusland, Seattle; J. T. Blackaller, San Francisco; R. Buckner, Houston; C. F. Scott, Kansas City; F. W. Copley, Buffalo; C. Walker, New Orleans; E. R. Bailey, Memphis; P. E. Morrill, St. Louis; W. A. Tanner, Chicago; H. J. Rohling, Chicago; A. N. Weeks, Boston; E. Ingstadt, Indianapolis; L. J. Finn, St. Louis, and H. W. Clements, Chicago.

WESTERN CO. CHANGES NAME

The Western Paper Mills Supply Company, with offices in the Park-American hotel, Kalamazoo, Mich., will in the future be known as the Paper Mills Supply Company.

Editorial

Vol. LXXVIII New York, April 10, 1924 No. 15

HENRY J. BERGER, Editor

THE OUTLOOK IN PAPER

The annual reviews presented elsewhere in this issue of the PAPER TRADE JOURNAL indicate pretty conclusively that 1923 was not an altogether satisfactory year in the pulp and paper industry. Business, however, has shown a slow but steady improvement since December, which marked the turning point from the slump of last year, and the indications are that business in the paper industry will show the same rate of improvement for the next few months at least that it has since the first of the year. No considerable boom is looked for but judging from present indications business is expected to be better than it was during the latter months of 1923.

The pressure on the paper industry the first three months of 1924 was not as heavy as at the start of last year when business was quite active but the business incline started slightly earlier this year than a year ago. Labor disturbances during the second quarter of last year, the recommendation from governmental sources that the building boom be suspended and disturbances of other kinds caused a panicky feeling to seize parts of the country with the result that jobbers fearing a repetition of their experience of 1920 when they were caught with large stocks and prices fell, ceased buying and began unloading what they had on hand. This resulted in a serious slump in business from which most manufacturers did not recover until late in the year. During the summer many mills were operating with curtailed forces and on short schedules while other plants laid up rather large stocks.

News print was about the only variety of paper not to suffer by the unsatisfactory conditions which prevailed during the latter part of last year. News in fact hung up a new high record, last year the production in the North American continent being 2,824,000 tons, which surpassed the previous high record in 1922 by 218,000 tons or nearly nine per cent. Consumption followed close on the heels of production and even with a number of marvellous new machines in Canada about ready to begin operations the future of this branch of the paper business is apparently not less bright than the recent past has been satisfactory.

The exceedingly heavy demand for advertising space in the large magazines, as evidenced by their enormous size, is resulting in a heavy demand for book papers. Several magazines of national circulation printed the largest editions in their history the last few weeks and reports from the publishing centers indicate a continuation of this heavy advertising. In spite of the heavy demand for book, manufacturers are not looking for increased prices. They are expecting the demand to continue stable and prices will remain at about their present levels.

A steady demand has existed for writing papers since early in the year and the demand and prices are now on a stable basis. There is little prospect of a change in prices either up or down. The same is true of the specialties although this class of paper seems to be affected more quickly by temporary market changes than other grades. This was evidenced last year when several specialties manufacturers were running on stock before the other mills were affected by the decline in demand.

The situation in the wrapping paper and kraft field is not as encouraging as in most of the other lines. Prices are less stable and there have been several price adjustments in the last few months. This is due to a variety of causes, among them overproduction and the importation of paper from Europe. A great deal of foreign kraft is finding its way into the American market, in spite of the import duty. In many instances the imported paper is sold under prices which will return reasonable profits to American manufacturers with the result that there have been some price reductions.

Chemical pulps also suffered considerably during the year because of foreign importations, a number of mills being forced to close down because foreign pulp could be obtained cheaper than pulp could be profitably manufactured here. The feeling against the admittance free of duty of wood pulp from abroad has undoubtedly been increased among pulp manufacturers as well as some paper makers by the disastrous competition that has been made possible by the depression in the value of most European currency and cheap labor which is making it possible for European pulp manufacturers to undersell domestic producers. This has severely handicapped many domestic pulp producers. When readjustment is completed in Europe, currency returns to a normal basis and the standard of living is again upwards, the price of foreign pulp will again be forced up and American pulp will not be so adversely affected by the present competition, but American pulp mills forced into receiverships or out of business entirely in the meanwhile by foreign competition will hardly be in a position to take care of the demand for home made pulp.

Taking a long view of the situation the year has been a fairly good one for the paper manufacturer. He has made reasonably good profits out of a business which has averaged up well. A new set of external problems have sprung up over which he has no direct control and which are having a profound influence on every industry in the country.

All that he can be expected to do is put his own house in order and keep it that way. This is what he has been doing. It is an assured fact that the paper industry is on a firmer basis today than it ever was and that the whole tendency is toward putting it on an even firmer one. This will take time, but nothing but improvement is in sight.

Optimism is the spirit of the day. It is not the hysterical optimism of the boom years, but the calm judgment that things are heading for the best. Sensible optimism is what the industry needs and confidence in its leaders together with faith to follow them.

PAPER WEEK IN NEW YORK

The Waldorf Astoria Hotel in New York assumed a paper atmosphere during the week that was unmistakable. While there have been changes in some respects from the years past the gratifying attendance at the convention was ample evidence that the annual meetings of the American Paper and Pulp Association, the National Paper Trade Association and kindred organizations may always be depended upon to attract all the representative paper

makers and paper merchants from all over the country, as well as a goodly representation of our neighbors from across the line, to New York at this time.

While the entertainment provided this year was unusually good, the Paper Week of 1924 will not by any means stand out in the annals of the paper industry for this reason alone. Much important business was accomplished. Among the most outstanding of this perhaps was the sentiment unanimously voiced for continuing in vigorous fashion the work that has already been started to prevent the upsetting of the industry by the increasingly large importations of various kinds of paper from abroad. While the quantity of this, as compared with the total manufactured here, is, perhaps, not large, there is no question but that it has been more and more disturbing the domestic market. The adverse effect of these importations psychologically, at least, is unquestioned, and, if the law provides means to prevent them, as it seemingly does, they should be made to cease at the earliest possible moment.

Although some mention of the fact was made last year it is not pleasant to learn that the American Paper and Pulp Association has not received during the year the financial support to which it is entitled. It is to be doubted if there is in any industry a similar association of which the members more justly may feel proud and this fact alone ought to make the matter of financing the association an easy and not a difficult and unpleasant matter. Apart from this loyalty that the parent organization of the paper industry deserves, the association under the competent direction of Dr. Hugh P. Baker is giving more and more evidence of the fact that it really is worth while and this good work should not be interrupted by perplexities of a financial character. Judging from the reports presented at the convention the revision in the activities of the association will undoubtedly work an improvement during the coming year.

The Second Annual Paper Industries Exhibition at the Grand Central Palace during the week was more impressive than a year ago when the exhibition was held for the first time. More space was occupied and individual exhibits were more attractive and interesting than at the first paper show. The exhibition has already become one of the main features of Paper Week in New York.

CLARKE FORESTRY BILL REPORTED

The House Committee on Agriculture has favorably reported to the House the Clarke forestry bill with a few changes.

Only minor changes were made in the text of the bill as referred to the committee. One change limits the authorized appropriation of $100,000 entirely to the reforestation of, and the growing of timber on farms. It was originally provided for the expenditure of this sum in that manner, and also on other than farm lands "suitable or chiefly suitable for timber production." This change was made at the instance of Chairman Haugen who thought that inasmuch as the bill authorizes $2,500,000 for general reforestation work, the $100,000 item should go wholly to assisting forestry work on farms. One of the other amendments changes another section of the bill so that the distribution of tree planting material by the Secretary of Agriculture shall be available for farm purposes, as well as for general reforestation, such as wind breaks, shelter beds, and farm woodlots. The only other change directs that the Geological Survey shall co-operate with the Secretary of Agriculture in examining and recommending to the National Forest Reservation Commission the purchase of such lands on the watersheds of navigable streams as are deemed necessary for the regulation of the waterflow or for the production of timber.

SOUTHERN CO. MAKES CHANGES

Important changes have been taking place with the Southern Cotton and Paper Company, Inc., of Chattanooga, Tenn. S. E. Seaman recently assumed management of the company, bringing in a new staff. The company has also recently completed new financing arrangements. Thomas Duff, who was formerly superintendent of the Beebe Holbrook and Massasoit divisions of the American Writing Paper Company and has been making paper for more than thirty years, has been added to the company's force.

The mill was originally started to make paper from linters when linters were less expensive. Due to the three consecutive short cotton crops and the increased price of linters, the company has switched to the use of hull fiber.

The plant has a fine new mill with a 112-inch Pusey & Jones Fourdrinier with ample beating and Jordan capacity. There is also a complete pulp mill for preparing the cotton for the company's paper manufacturing as well as for the pulp operations. The concern also has six cards for making absorbent cotton and specialties.

Mercer Reynolds is president of the company and is responsible for this pioneer fine mill of the South. The mill is due to start operation in a few days. A medium priced rag base bond, all rag book, all rag blotter and some medium priced rag base writings will be produced. In addition the company will make chemical pulp which is cotton linters especially prepared to be used as a base for the manufacture of artificial silk, artificial leather, moving picture films, celluloid and lacquers. Donal Munson, a chemical engineer, is another of the company's acquisitions. Mr. Seaman and he developed cotton linters and hull fiber at Hopewell, Va., and it was as a result of their work that the Stamsocott Company was formed.

NORTHWEST SUPERINTENDENTS TO MEET

The Northwest Division of the Superintendents' Association will hold a convention at Marinette, Wis., on Friday and Saturday, May 2 and 3.

The committee has arranged a splendid program and some very interesting and instructive papers will be presented at the meeting. The program also includes an inspection of paper mills in this locality.

Lunch for members and guests will be served in the cafeteria of the Marinette and Menominee Paper Company, Saturday noon, May 3.

Good speakers have been obtained for the banquet Saturday evening, who will talk on live, interesting subjects; a fine musical program also has been arranged. The complete program will be announced later.

The program committee is as follows: Wm. Eibel, treasurer and general manager, Peshtigo Paper Company; W. W. Hinnenthal, assistant manager, Marinette and Menominee Paper Company; P. J. Lamoureaux, general superintendent, Marinette & Menominee Paper Company; P. J. Sievert, superintendent Park Mills, Marinette and Menominee Paper Company; J. H. Slater, manager, Escanaba Paper Company; A. G. Stone, superintendent Menominee Mill, Marinette and Menominee Paper Company.

GREAT LAKES PAPER CO. ACQUIRES PULP WOOD

Raw material for the operation of the new pulp plant of the Great Lakes Paper Company, at Fort William, Ont., is now arriving by rail and ten thousand cords of pulp wood are piled on the ground, while there are thirty thousand cords more coming in by rail and water. J. H. Black, of Toronto, president of the company, has completed arrangements for the booming of the pulpwood, having secured from the city of Fort William the right to boom in front of the property on the Kaministiquia river. The new pulp plant, which will have a capacity of one hundred and eighty tons of ground wood daily, will begin operations toward the end of May.

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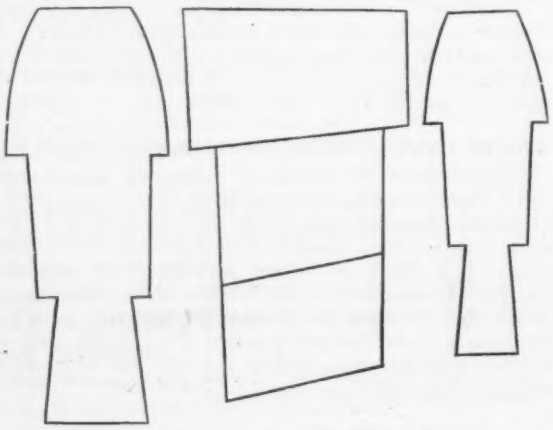

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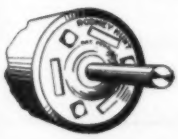

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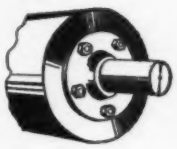

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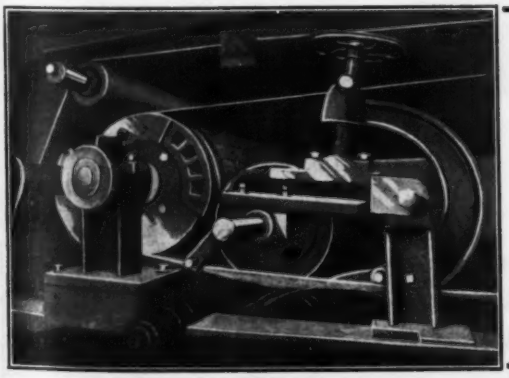

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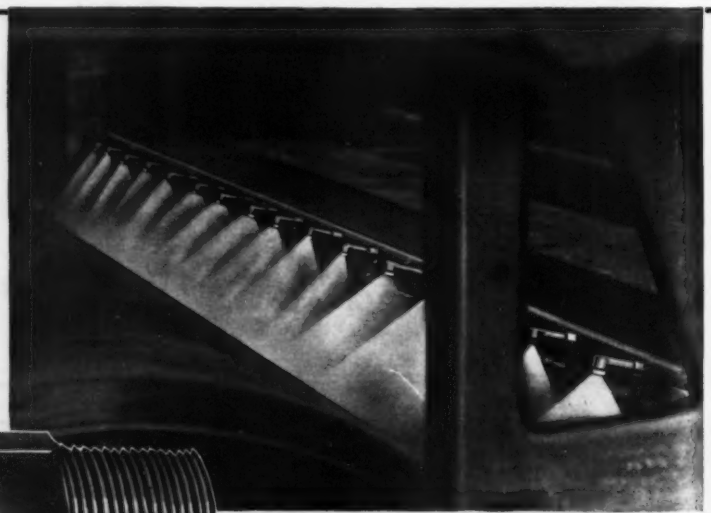

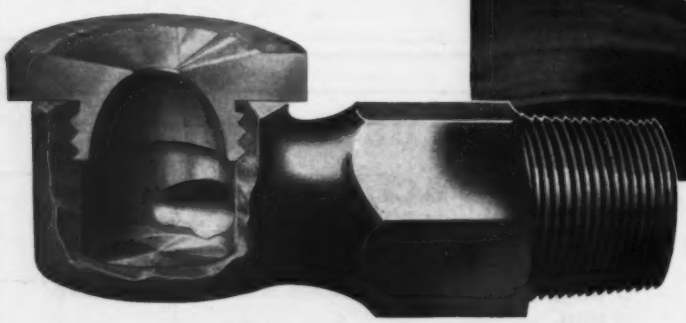

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NEW YORK IMPORTS

WEEK ENDING APRIL 5, 1924

SUMMARY

Printing paper.....27 cs., 6 rolls
Hangings .....19 bls., 1 cs.
Wall paper .....1,211 bls., 280 cs.
Filter paper.....2 cs.
Wrapping paper .....130 rolls
Cigarette paper .....66 cs.
Tissue paper .....9 cs.
Surface-coated paper .....22 cs.
Colored paper .....9 cs.
Copy paper .....12 cs.
Oatmeal paper .....632 rolls
Packing paper .....458 rolls, 166 bls.
Miscellaneous paper.....65 cs., 109 bls.

CIGARETTE PAPER

Rose & Frank, Waukegan, Havre, 40 cs.
P. J. Schmeitzer, Syria, Marseilles, 26 cs.

PAPERHANGINGS

A. C. Dodman, Jr., Inc., Lancastria, Liverpool, 1 cs.
A. C. Dodman, Jr., Inc., by same, 16 bls.
A. C. Dodman, Jr., Inc., Celtic, Liverpool, 3 bls.

WALL PAPER

F. J. Emmerich, Celtic, Liverpool, 3 bls.
A. C. Dodman, Jr., Inc., Poland, Antwerp, 5 bls.
A. C. Dodman, Jr., Inc., by same, 7 cs.
The Prager Co., Veendam, Rotterdam, 264 bls.
The Prager Co., by same, 1,172 bls.
W. H. S. Lloyd & Co., Valacia, London, 31 bls.
W. H. S. Lloyd & Co., by same, 9 cs.

TISSUE PAPER

F. C. Strype, Celtic, Liverpool, 6 cs.
H. Reeve Angel & Co., Inc., Hamburg Maru, Kobe, 1 cs.
Iwai & Co., by same, 2 cs.

COPY PAPER

R. F. Downing & Co., Hamburg Maru, Kobe, 12 cs.

PRINTING PAPER

C. Steiner, Veendam, Rotterdam, 4 cs.
B. F. Drakenfeld & Co., Celtic, Liverpool, 23 cs.
Draeger Shipping Co., L. Heemsoth, Hamburg, 6 rolls.

OATMEAL PAPER

National City Bank, L. Heemsoth, Hamburg, 632 rolls.

PACKING PAPER

National City Bank, L. Heemsoth, Hamburg, 166 bls.
Republic Bag & Paper Co., by same, 458 rolls.

WRAPPING PAPER

Republic Bag & Paper Co., L. Heemsoth, Hamburg, 130 rolls.

FILTER PAPER

American Express Co., Braga, Marseilles, 2 cs.

SURFACE COATED PAPER

Gevaert Co. of America, Poland, Antwerp, 22 cs.

COLORED PAPER

C. W. Williams, Poland, Antwerp, 7 cs.
H. D. Catty & Co., by same, 2 cs.

PAPER

M. O'Meara Co., Fred VIII, Copenhagen, 109 bls.
Perry, Ryer & Co., Tarantia, Glasgow, 56 cs.
F. C. Strype, Veendam, Rotterdam, 4 cs.
H. Reeve Angel & Co., Inc., Valacia, London, 5 cs.

RAGS, BAGGINGS, ETC.

E. J. Keller Co., Inc., Missouri, Havre, 77 bls. bagging.
Guaranty Trust Co., by same, 495 bls. rags.
Goldman, Sachs & Co., by same, 972 bls. rags.
Castle & Overton, Middleham Castle, Barcelona, 83 bls. bagging.
D. M. Hicks, by same, 699 bls. paper stock.
International Acceptance Bank, Maryland, London, 81 bls. rags.
International Acceptance Bank, Caucasier, Antwerp, 144 bls. rags.
Equitable Trust Co., by same, 210 bls. flax waste.
Brown Bros. & Co., by same, 559 bls. rags.
Guaranty Trust Co., by same, 246 bls. rags.
Castle & Overton, by same, 45 bls. rags.
Castle & Overton, by same, 67 bls. bagging.
E. J. Keller Co., Inc., by same, 19 bls. linen threads.
E. J. Keller Co., Inc., by same, 443 bls. rags.
E. J. Keller Co., Inc., Fred VIII, Copenhagen, 393 bls. rags.
Castle & Overton, by same, 133 bls. rags.
Castle & Overton, Idaho, Antwerp, 74 bls. rags.
Castle & Overton, by same, 60 bls. bagging.
Castle & Overton, Devonian, London, 68 bls. bagging.
Castle & Overton, Kerhounkson, Belfast, 71 bls. waste.
Prince & Kennedy, Inc., Kerhounkson, Dublin, 71 bls. bagging.
Katzenstein & Keene, Inc., by same, 414 bls. rags.
Katzenstein & Keene, Inc., Syria, Marseilles, 139 bls. rags.
Goldman, Sachs & Co., by same, 86 bls. rags.
E. Butterworth & Co., Inc., Jessmore, Liverpool, 78 bls. rags.
E. J. Keller Co., Inc., Waukegan, Dunkirk, 85 bls. rags.
D. M. Hicks, by same, 27 bls. paper stock.
Anglo South American Bank, Archimedes, Manchester, 20 bls. bagging.
Equitable Trust Co., by same, 49 bls. new cuttings.
New York Trust Co., by same, 85 bls. rags.
Guaranty Trust Co., by same, 277 bls. rags.
Guaranty Trust Co., Segundo, Naples, 105 bls. rags.
Castle & Overton, by same, 99 bls. waste.
E. J. Keeler Co., Inc., Segundo, Leghorn, 135 bls. rags.
E. J. Keller Co., Inc., Poland, Antwerp, 152 bls. flax waste.
A. W. Fenton, Ala, Antwerp, 68 bls. rags.
E. J. Keller Co., Inc., Alberta, Trieste, 127 bls. rags.
E. J. Keller Co., Inc., Aldecoa, Barcelona, 147 bls. bagging.
Katzenstein & Keene, Inc., by same, 192 bls. bagging.
Katzenstein & Keene, Inc., by same, 593 bls. new cuttings.
Katzenstein & Keene, Inc., by same, 953 bls. rags.
Katzenstein & Keene, Tarantia, Glasgow, 16 bls. rags.
G. M. Granes, by same, 50 bls. bagging.
F. P. Gaskell, by same, 35 bls. paper stock.
Guaranty Trust Co., by same, 111 bls. paper stock.
American Express Co., by same, 63 bls. paper stock.
Mechanics & Metals National Bank, by same, 227 bls. rags.
New York Trust Co., by same, 285 bls. rags.
E. J. Keller Co., Inc., L. Heemsoth, Hamburg, 42 bls. rags.
Guaranty Trust Co., by same, 267 bls. rags.
Flintkote Co., by same, 116 bls. rags.
American Express Co., by same, 198 bls. rags.

OLD ROPE

E. J. Keller Co., Inc., Alberta, Trieste, 64 coils.
E. J. Keller Co., Inc., Grootendyk, Rotterdam, 99 coils.
E. J. Keller, Missouri, Havre, 51 coils.
New York Trust Co., by same, 51 coils.
W. Schall & Co., Aldecoa, Barcelona, 40 coils.
Equitable Trust Co., Veendam, Rotterdam, 156 coils.
Brown Bros. & Co., by same, 112 coils.
Brown Bros. & Co., Fred VIII, Copenhagen, 42 coils.
Brown Bros. & Co., Poland, Antwerp, 172 coils.
Brown Bros. & Co., by same, 53 bls.

WOOD PULP

E. M. Sergeant & Co., Fred VIII, Kristiania, 508 bls. sulphite pulp.
Johanesson, Wales & Sparre, Inc., Fred VIII, Gothenburg, 500 bls. sulphite pulp.
E. J. Keller Co., Inc., Alberta, Trieste, 1,350 bls. wood pulp.
M. Gottesman & Co., Inc., by same, 701 bls. wood pulp.
Poland Paper Co., by same, 5,200 bls. wood pulp.

WOOD FLOUR

Irving Bank-Columbia Trust Co., L. Heemsoth, Hamburg, 1,682 bags, 89,300 kilos.

CASEIN

Atterbury Bros., Inc., Vauban, Buenos Aires, 834 bags.
T. M. Duche & Sons, Bonheur, Buenos Aires, 417 bags.

BOSTON IMPORTS

WEEK ENDING APRIL 5, 1924

G. M. Granes & Co., M. S. Dollar, Marseilles, 113 bls. rags.
Katzenstein & Keene, Inc., Burgerdyk, Rotterdam, 216 bls. rags.
Baring Bros. & Co., Maryland, London, 133 bls. waste paper.
Brown Bros. & Co., by same, 321 coils old rope.
Brown Bros. & Co., by same, 29 bls. old rope.
Atterbury Bros., Inc., Bonheur, Buenos Aires, 834 bags casein.
Kalbfleisch Corp., by same, 834 bags casein.
First National Bank of Boston, by same, 417 bags casein.
Castle & Overton, Westerner, Rotterdam, 239 bls. wood pulp.
E. J. Keller Co., Inc., Pinasta, Rotterdam, 499 bls. wood pulp.

BALTIMORE IMPORTS

WEEK ENDING APRIL 5, 1924

A. Brown & Sons, Waukegan, Dunkirk, 762 bls. rags.
M. Gottesman Co., Inc., Ermland, Mantylucto, 2,456 bls. wood pulp.
Castle & Overton, Westerner, Rotterdam, 636 bls. wood pulp.

NEW ORLEANS IMPORTS

WEEK ENDING APRIL 5, 1924

Castle & Overton, Maasdam, Rotterdam, 69 bls. rags.
Castle & Overton, Capt. Lemerle, Havre, 260 bls. rags.
M. Gottesman & Co., Inc., Ludovici, Trieste, 502 bls. wood pulp.

(*Continued on page 326*)

SPECIAL EASY BLEACHING

US

US

U S 1/2

US★

HB SPECIAL SULPHITE EASY BLEACHING

KRAFT HB SPECIAL

E. M. Sergeant Co.

WOOD PULP

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THE ROLAND T. OAKES CO., Holyoke, Mass.

Electrical Specialists. *Established 1885*

for **PAPER MAKING**

Imports and Exports of Paper and Paper Stock

(*Continued from page 324*)

PHILADELPHIA IMPORTS

WEEK ENDING APRIL 5, 1924

Castle & Overton, Ala, Antwerp, 509 bls. rags.
Webb & Son, by same, 10 bls. rags.
H. F. Watson, by same, 107 bls. rags.
Katzenstein & Keene, Inc., by same, 81 bls. rags.
E. J. Keller Co., Inc., by same, 470 bls. rags.
L. H. Abenheimer, by same, 184 bls. rags.
D. J. Murphy, by same, 37 bls. rags.
Philadelphia National Bank, by same, 100 bls. rags.
Philadelphia National Bank, Syria, Marseilles, 264 bls. rags.
Philadelphia National Bank, by same, 38 bls. new cuttings.
Castle & Overton, by same, 334 bls. rags.
New York Trust Co., by same, 382 bls. rags.
Equitable Trust Co., by same, 293 bls. rags.
Equitable Trust Co., by same, 26 bls. new cuttings.
D. J. Murphy, Segundo, Marseilles, 311 bls. rags.
E. J. Keller Co., Inc., Aldecoa, Barcelona, 566 bls. rags.
Bank of New York, by same, 411 bls. rags.
D. M. Hicks, by same, 266 bls. rags.
Katzenstein & Keene, Inc., by same, 440 bls. rags.
Katzentein & Keene, Inc., London Commerce, London, 152 bls. rags.
E. J. Keller Co., Inc., Parta, Bremen, 28 bls. rags.
E. J. Keller Co., Inc., Innoko, Rotterdam, 31 bls. rags.
E. J. Keller Co., Inc., Gorm, Copenhagen, 80 bls. rags.
E. J. Keller Co., Inc., Burgerdyk, Rotterdam, 309 bls. rags.
Castle & Overton, Naperian, Rotterdam, 285 bls. rags.
Castle & Overton, Naperian, Antwerp, 105 bls. rags.
Castle & Overton, Hoosac, Glasgow, 480 bls. waste paper.
Castle & Overton, by same, 89 bls. rags.
Castle & Overton, Naples Maru, Hamburg, 96 bls. rags.
Castle & Overton, Zarembo, Havre, 541 bls. rags.
Castle & Overton, Manchester Mariner, Manchester, 675 bls. rags.
E. J. Keller Co., Inc., Burgerdyk, Rotterdam, 111 bls. old rope.
Johaneson, Wales & Sparre, Gorm, Gothenburg, 710 bls. sulphite pulp, 700 bls. sulphate.

PAPER STOCK MEN ADOPT SPECIFICATIONS

The regular monthly meeting of the American Paper Stock Association was held on March 30, at the Lexington Hotel, Chicago. It was very well attended and the business which was to have been acted upon at the previous meeting, and which was postponed because of light attendance, was acted upon promptly.

The committee on specifications made a favorable report which was adopted by the members. These specifications are as follows:

No. 1 MIXED PAPERS—This grade shall consist of dry waste paper which has been sorted and cleaned by screening, dusting or hand sorting, and packed in machine pressed bales weighing not less than 800 pounds or more than 1,500 pounds. Not to contain more than one (1%) per cent of foreign materials and objectionable papers. See definitions:

No. 2 MIXED PAPERS—Dry, unsorted paper in bales of 100 pounds or over. Not to contain more than five (5%) per cent, either weight or bulk, of foreign material, and objectionable papers. This grade to be free from City Dump Paper. See definitions.

DUMP OR CITY MIXED—To be packed and sold as such.

BOX BOARD CUTTINGS—To consist wholly of cuttings and clippings from paper box factories. It shall be dry and free from dirt and refuse matter, and packed in bales weighing 100 pounds and over. This grade to be accepted as good delivery on No. 1 repacked Mixed Papers.

OVER ISSUES, NEWS—This grade shall consist of overruns and unsold newspapers direct from the newspaper offices, folded as they come from the press in securely tied bundles.

No. 1 NEWS—Strictly dry, clean, sorted and repacked newspapers in machine pressed bales weighing not less than 500 pounds or more than 1500 pounds. Not to contain more than one (1%) per cent of foreign material and objectionable papers. See definition:

No. 2 NEWS—This grade shall consist of dry newspaper, which has not been recleaned or sorted, in bales weighing between 500 and 1,500 pounds each. Not to contain more than five (5%) per cent of foreign material and objectionable papers. See definitions:

BUNDLED NEWS—Same grade as No. 2 and to be sold as such.

NEWS BLANKS—Shall consist of white news cuttings or sheets, free from all printed matter, and not to contain more than two (2%) per cent tinted blanks. In bales of 400 to 1,500 pounds each.

No. 1 PRINTED MANILAS—Shall consist of dry, sorted and repacked manilas and strong fiber paper, writing paper and good office waste, in bales of 400 to 1,500 pounds each. Not to contain over three (3%) per cent of mixed news and/or box cuttings and to be practically free of objectionable paper and foreign material. See definitions:

CONTAINER MANILAS—Shall consist of sorted or unsorted department store paper, which contains a large per cent of strong fiber stock, in bales of 300 pounds or over. Not to contain more than three (3%) per cent of foreign material and objectionable paper. See definitions:

No. 1 KRAFT—Shall consist of dry, sorted and cleaned kraft papers in bales of 300 to 1,200 pounds each. This stock must not contain more than one and one-half (1½%) per cent of foreign material and objectionable papers, and must be absolutely free of tarred stock. See definitions:

HARD WHITE SHAVINGS—Shall consist of dry, hard, sized, white writing paper, free from all colors and tints, ground wood, foreign materials and objectionable papers. May have some machine ruled paper, but not printed ruled. In bales 400 to 1,200 pounds each. See definitions:

SOFT WHITE SHAVINGS—Shall consist of dry, all white book paper cuttings, not to contain more than two (2%) per cent ground wood, colors and tints or more than eight (8%) per cent coated paper. In bales 400 to 1,200 pounds each.

DEFINITIONS—Foreign material includes every non-paper substance. Objectionable Papers, including Paraffined, Greased, Glazed, Parchment, Tar, Carbon, Wall Paper, Book Covers and Strings.

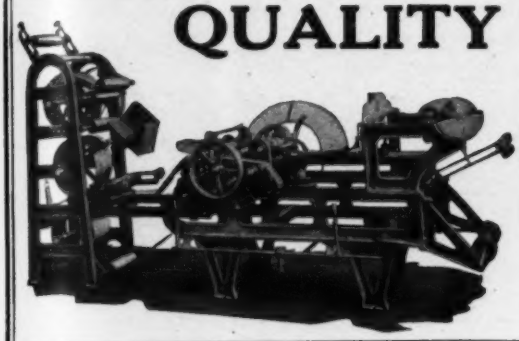
These specifications not only give the paper manufacturer the satisfaction of knowing that he can now procure standard packing, but the by-laws of the association provide that all packing sold under these specifications must be warranted by the member making the sale, which means, in effect, that the paper mill will get exactly what it buys. This, of course, is a simple rule as applied to general merchandising, but a more complexed one when applied to the packer of paper stock as the trade very well knows.

Paper manufacturers throughout the United States are invited to criticize these specifications with a view to discovering whether they can be improved within the scope of practicability and any constructive criticism will be gladly received by Secretary Francis Hughes, 2100 Loomis street, Chicago, and properly placed before the association.

The committee on membership reported six new applications, while three concerns were admitted to membership. These are: Consolidated Wastex Paper Company, Milwaukee, Wis.; Levine Waste Paper Company, Detroit, Mich., and the Ajax Waste Paper Company, of Chicago.

The next meeting of the American Paper Stock Association will take place at the Congress Hotel, April 30. A full attendance is expected.

QUALITY *plus* PRODUCTION



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The Superintendent of a large bag plant, unsolicited, writes: "All the machines used by this Company have been furnished by you. During my fifteen years in the bag line I have used your machines, and consider them the best square and flat bag machines on the market. I see no reason why the bag manufacturers should not be satisfied with your machines. The design of the Fischer machines and workmanship are A No. 1."
Let us quote you on your requirements of flat and square, as well as satchel bottom machines for making 1/16, ⅛ and ¼ barrel sizes.

FISCHER MACHINE CO.
310-316 N. Eleventh St., Philadelphia, Pa.

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HAFSLUND NORWAY — "HAFSLUND BEAR" Bleached Sulphite

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KRAFT HURUM NORWAY SPECIAL — "HURUM SPECIAL" Extra Strong Kraft

KOOS BAC — "BAMBLE" Extra Strong Kraft

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SMALL PAPER ROLLS

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ADDING MACHINE ROLLS, CASH REGISTER ROLLS, TICKER TAPE, CLOCK ROLLS, BLASTING, DIE WIPING, TIRE WRAP, BED WRAP, BACKING PAPER, MAILING MACHINE ROLLS

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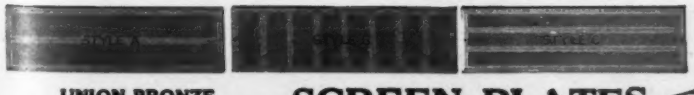

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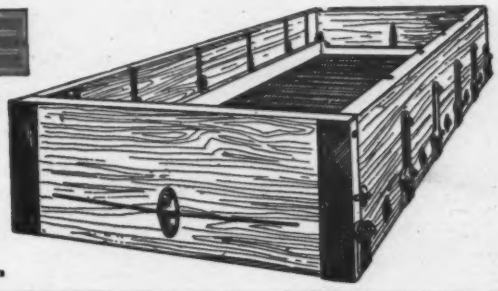

Market Quotations

PAPER SECURITIES CLOSING PRICES TUESDAY

Reported by Stewart Tuttle & Co., Inc., 120 Broadway, New York

Stocks	BID	ASKED
Abitibi Power and Paper Company, Ltd.	60⅞	61¼
Abitibi Power and Paper Company, Ltd, Pfd.	100½	104
American Writing Paper Company, Pfd.	1½	2½
Brompton Pulp and Paper Company, Ltd.	39¼	39¾
Donnacona Paper Company, Ltd.	245	255
Donnacona Paper Company, Ltd., Pfd.	98	100
International Paper Company	37¾	38
International Paper Company, Pfd.	64½	65
Laurentide Company, Ltd.	89	90
Price Brothers	40¼	41
St. Maurice Paper Co., Ltd.	94½	95
Smith (Howard) Paper Mills, Ltd.	58	60
Spanish River Pulp and Paper Mills, Ltd.	105	105¼
Spanish River Pulp and Paper Mills, Pfd.	113⅛	113¾
Union Bag and Paper Corp.	50	55
Wayagamack Pulp and Paper Company, Ltd.	35	37¾
West Virginia Pulp and Paper Company	53½	55

Bonds	BID	ASKED
Abitibi Power and Paper Company, Ltd., 1st 6s, 1934	99	101
Abitibi Power and Paper Company, Ltd., Gen. 6s 1940	92	95
Abitibi Power and Paper Company, Ltd., Con. 8s 1931	102½	103½
Belgo Canadian Paper Company, 1st 6s 1943	93¼	93¾
Brown Company Serial 6s	97	98
Carthage Sulphite Pulp and Paper Company, 1st 8s 1941	35	50
Continental Paper and Bag Mills Corporation, 1st and Ref. 6½s, Series "A," 1944	94	96
Donnacona Paper Company, Ltd., 1st 6s 1940	97	98½
Eddy Paper Company, 1st 7½s 1931	97½	99½
Gair (Robert) Company, 1st 7s 1937	96	98
International Paper Company, 1st and Ref. 5s (Series "B") 1947	82¼	84¼
Mattagami Pulp and Paper Company, 1st 6s 1937	60	63
Mattagami Pulp and Paper Company, 1st 7s 1949	20	25
Oswego Falls Corporation, 1st 8s 1942	100¾	101¾
Oxford Paper Company, 1st and Ref. 6s (Series "A") 1947	97	100
Parker, Young Company, 1st 6½s 1944	95½	97½
Paterson Parchment Paper Company, 1st 6s (Series "A") 1938	96½	98
Peshtigo Paper Company, 1st 7s (Series "B") 1942	92	94½
Price Bros. & Co., Ltd., 1st 6s (Series "A") 1943	96¾	97¾
Provincial Paper Mills, Ltd., 1st 6s 1940	98	100
Riordon Pulp and Paper Company, Ltd., Gen. 6s 1929	18	24
Riordon Pulp and Paper Company, Ltd., 6s 1942	71½	73
Riordon Company, Ltd., 1st and Ref. 8s 1940	67	69
River Raisin Paper Company, 1st 8s 1936	103½	105
Smith (Howard) Paper Mills, Ltd., 6s 1934	99¾	101
Smith (Howard) Paper Mills, Ltd., 1st Ref. 7s 1941	93	96
Spanish River Pulp and Paper Mills, Ltd., 1st 6s 1931	99	100
Spanish River Pulp and Paper Mills, Ltd., Gen. 8s 1941	102¾	103¾
Wayagamack Pulp and Paper Company, Ltd., 1st 6s 1951	74	77

Paper

F. o. b. Mill	
Ledgers 11.00	@38.00
Bonds 9.00	@45.00
Writings—	
Extra Superfine.. 14.00	@30.00
Superfine 14.00	@30.00
Tub Sized 10.00	@15.00
Engine Sized 8.00	@11.00
News—f. o. b. Mill—	
Rolls, contract .. 3.75	@ 4.00
Rolls, transit..... 3.75	@ 4.25
Sheets 4.25	@ 4.50
Side Runs 3.50	@ 4.15
Book, Cased—f. o. b. Mill—	
S. & S. C..... 7.25	@ 9.00
M. F. 7.10	@ 8.85
Coated and Enamel 9.00	@14.00
Lithograph 9.00	@14.00
Tissues—f. o. b. Mill—	
White No. 1 .... .75	@ .76
White No. 2 .... .70	@ .80
Colored 1.05	@ 1.90
Anti-Tarnish 1.35	@ 1.90
Kraft ..... .85	@ 1.10
Manila ..... .75	@ .80
Kraft—f. o. b. Mill—	
No. 1 Domestic.. 5.85	@ 6.20
No. 2 Domestic.. 5.15	@ 5.75
Imported 4.75	@ 5.20
Manila—	
No. 1 Jute 7.50	@ 9.00
No. 2 Jute 7.75	@ 8.50
No. 1 Wood.... 4.75	@ 5.25
No. 2 Wood.... 4.00	@ 4.50
Butchers 4.25	@ 4.75
Fibre Papers—	
No. 1 Fibre 5.50	@ 5.75
No. 2 Fibre 5.00	@ 5.25
Common Bogus.. 3.50	@ —
S. Screening 3.25	@ 3.75
Card Middles 4.00	@ 5.00

Boards—per ton—	
News 55.00	@60.00
Straw 61.00	@63.00
Chip 50.00	@55.00
Binders' Boards..70.00	@75.00
Sgl. Mla. Ll. Chip65.00	@75.00
Wood Pulp 70.00	@75.00
Container 70.00	@80.00
Sulphate Screenings—	
Coarse ..... .80	@ .90
Refined 1.75	@ 2.00
Ground Wood—	
Screenings 20.00	@25.00
Glassine—	
Bleached, basis 25 lbs. 12.00	@15.00
Bleached, basis 20 lbs. 14.00	@17.00

Mechanical Pulp

(Ex-Dock)

No. 1 Imported..29.00	@34.00
(F. o. b. Mill)	
No. 1 Domestic..29.00	@34.00

Chemical Pulp

(Ex-Dock, Atlantic Ports)

Sulphite (Imported)—	
Bleached 3.75	@ 4.25
Easy Bleaching.. 2.50	@ 2.75
No. 1 strong unbleached 2.90	@ 3.10
No. 2 strong unbleached 2.20	@ 2.40
No. 1 Kraft..... 2.50	@ 3.00
Sulphate—	
Bleached 3.40	@ 3.80
(F. o. b. Pulp Mill)	
Sulphite (Domestic)—	
Bleached 3.40	@ 4.15
Easy Bleaching Sulphite 2.30	@ 2.90
News Sulphite..... 2.20	@ 2.40
Mitscherlich 2.30	@ 2.90
Kraft (Domestic).. 2.20	@ 2.70
Soda Bleached..... 3.90	@ 4.10

Domestic Rags

New

Prices to Mill, f. o. b. N. Y.	
Shirt Cuttings—	
New White,No. 1 13.00	@13.50
New White,No. 2 6.25	@ 6.75
Silesias, No. 1... 7.25	@ 7.75
New Unbleached.10.50	@11.00
Washables 5.26	@ 6.15
Fancy 6.25	@ 6.75
Blue Overall 7.15	@ 8.15
New Blue 5.00	@ 5.50
New Black Soft. 4.65	@ 5.15
New Light Seconds 2.75	@ 3.00
O. D. Khaki Cuttings 4.04	@ 4.15
Men's Corduroy.. 3.65	@ 4.00
New Canvas ... 6.40	@ 7.00
New Black Mixed. 2.50	@ 2.75
White, No. 1—	
Repacked 6.25	@ 6.75
Miscellaneous ... 5.50	@ 5.75
White, No. 2—	
Repacked 4.00	@ 4.25
Miscellaneous ... 3.50	@ 3.65
St. Soiled, White 2.80	@ 3.00
Thirds and Blues—	
Repacked 3.00	@ 3.25
Miscellaneous ... 2.35	@ 2.45
Black Stockings .. 3.00	@ 3.25
Roofing Rags—	
Cloth Strippings.. 2.30	@ 2.40
No. 1 ..... 2.05	@ 2.15
No. 2 ..... 1.25	@ 1.35
No. 3 ..... 1.20	@ 1.30
No. 4 ..... 1.20	@ 1.30
No. 5A..... 1.50	@ 1.60

Foreign Rags

New Light Silesias. 7.00	@ 7.75
Light Flannelettes.. 8.00	@ 8.25
Unbl'chd Cottons... 9.00	@ 9.50
New White Cuttings 10.00	@11.50
New Light Oxfords 7.25	@ 7.75
New Light Prints.. 6.75	@ 7.25
New Mixed Cuttings 2.50	@ 2.75
New Dark Cuttings. 2.00	@ 2.25
No. 1 White Linens 9.00	@10.00
No. 2 White Linens 7.00	@ 8.00
No. 3 White Linens 6.00	@ 6.50
No. 4 White Linens 4.00	@ 5.00
Old Extra Light Prints 3.15	@ 3.25
Ord. Light Prints.. 2.75	@ 3.00
Med. Light Prints.. 2.40	@ 2.50
Dutch Blue Cotton. 3.25	@ 3.50
German Blue Cottons 3.00	@ 3.20
Ger. Blue Linens.. 3.00	@ 3.25
Checks and Blues.. 2.00	@ 2.15
Dark Cottons ... 2.00	@ 2.10
Shoppery 1.75	@ 1.85
French Blues 3.25	@ 3.50

Bagging

Prices to Mill F. o. b. N. Y.	
Gunny No. 1—	
Foreign 1.30	@ 1.40
Domestic 1.20	@ 1.30
Wool, Tares, light.. 1.30	@ 1.40
Wool, Tares, heavy 1.40	@ 1.50
Bright Bagging.... 1.10	@ 1.20
Sound Bagging ... .90	@ 1.00
Manila Rope—	
Foreign 6.25	@ 6.50
Domestic 6.50	@ 6.75
New Bu. Cut..... 2.15	@ 2.25
Hessian Juts Threads—	
Foreign 2.00	@ 2.25
Domestic 2.00	@ 2.10

Twines

Cotton—(F. o. b. Mill)—	
No. 1 ..... .30	@ .38
No. 2 ..... .29	@ .31
No. 3 ..... .34	@ .36
India, No. 6 basis—	
Light ..... .17	@ .18
Dark ..... .16	@ .17
B. C., 18 basis.... .41	@ .42
A. B. Italian, 18 Basis ..... .51	@ .61
Finished Jute—	
Dark, 18 basis.. .29	@ .30
Light, 18 basis.. .26	@ .27
Jute Wrapping, 3-6 Ply—	
No. 1 ..... .20	@ .23
No. 2 ..... .18	@ .20
Tube Rope—	
4-ply and larger. .15	@ .17
Fine Tube Yarn—	
5-ply and larger.. .19	@ .21
4-ply ..... .20	@ .22
3-ply ..... .20	@ .22
Unfinished India—	
Basis ..... .16	@ .17
Paper Makers' Twine	
Balls ..... .09	@ .11
Box Twine, 2-3 ply .14	@ .15
Jute Rope ..... .15	@ .16
Amer. Hemp, 6.... .30	@ .32
Sisal Hay Rope—	
No. 1 Basis.... .14	@ .16
No. 2 Basis..... .10	@ .12
Sisal Lath Yarn—	
No. 1 ..... .14	@ .15
No. 2 ..... .11	@ .13
Manila Rope ..... .18	@ .19

Old Waste Papers

(F. o. b. New York)

Shavings—	
Hard,White, No. 1 4.10	@ 4.15
Hard,White, No. 2 3.20	@ 3.30
Soft, White, No. 1 3.10	@ 3.30
Flat Stock—	
Stitches 1.70	@ 1.80
Over Issue Mag. 1.70	@ 1.80
Solid Flat Book.. 1.50	@ 1.60
Crumbled No. 1.. 1.25	@ 1.35
Solid Book Ledger. 2.15	@ 2.25
Ledger Stock 1.90	@ 2.05
New B. B. Chips. .65	@ .80
Manilas—	
New Env. Cut... 2.45	@ 2.55
New Cut No. 1.. 1.75	@ 2.00
Extra No. 1 old. 1.30	@ 1.40
Print 1.10	@ 1.25
Container Board.. .90	@ 1.00
Bogus Wrapper.. .90	@ 1.00
Old Krafts Machine compressed bales. 2.15	@ 2.25
News—	
No. 1 White News 2.15	@ 2.25
Strictly Overissue 1.15	@ 1.25
Strictly Folded .. .85	@ .95
No. 1 Mixed Paper .60	@ .70
Common Paper ... .50	@ .60

CHICAGO

[FROM OUR REGULAR CORRESPONDENT]

Paper

F. o. b. Mill	
All Rag Bond..... 35	@ 40
No. 1 Rag Bond.. 30	@ 35
No. 2 Rag Bond.. 14	@ 25
Water Marked Sulphite 9	@ 12
Sulphite Board 7¼	@ 10¾
Sulphite Ledger ... 9½	@ 12
Superfine Writing.. 18	@ 24
No. 1 Fine Writing 14	@ 18
No. 2 Fine Writing 12	@ 14
No. 3 Fine Writing 9	@ 12
No. 1 M. F. Book 5¾	@ 7½
No. 1 S. & S. C. Book 6¼	@ 7¾
Coated Book 8	@ 10
Coated Label 8	@ 10
News—Rolls, mill— 3¾	@ 4½
News—Sheets, mill 4	@ 4¾
No. 1 Manila..... 5	@ 6
No. 1 Fibre..... 5¼	@ 5¾
No. 2 Manila..... 4¾	@ 5
Butchers' Manila .. 4½	@ 4⅝
No. 1 Kraft..... 5½	@ 6½
No. 2 Kraft..... 5½	@ 6¾
Wood Tag Boards.. 4½	@ 6
Screenings 3	@ —
Boards, per ton—	
Plain Chip $47.50	@50.00
Solid news 50.00	@52.50
Manila Line Chip 57.50	@60.00
Container Lined—	
85 Test 65.00	@67.50
100 Test ..... —	@75.00

Old Papers

F. o. b. Chicago

Shavings—	
No. 1 Hard White 3.25	@ 3.35
No. 1 Soft Shav. 2.75	@ 2.85
No. 1 Mixed..... 1.25	@ 1.35
No. 2 Mixed 1.15	@ 1.25
White Envel. Cuttings 3.40	@ 3.50
Ledgers and Writings 1.65	@ 1.75
Solid Books 1.50	@ 1.55
No. 1 Books, Light 1.40	@ 1.50

Blanks	2.25	@	2.35
Ex. No. 1 Manila	2.35	@	2.45
Manila Envelope Cuttings	2.45	@	2.50
No. 1 Manilas	1.25	@	1.30
Folded News (over issue)	1.20	@	1.25
Old Newspapers—			
No. 1	1.05	@	1.10
No. 2	.90	@	.95
Mixed Papers—			
No. 1	.80	@	.85
No. 2	.70	@	.75
Straw Clippings	.90	@	1.00
Binders' Clippings	1.00	@	—
Kraft	2.20	@	2.30
New Kraft Cuts	2.50	@	—
Roofing Stock, f. o. b. Chicago, Net Cash—			
No. 1	43.00	@	—
No. 2	41.00	@	—
No. 3	39.00	@	—
No. 4	38.00	@	—

PHILADELPHIA

[FROM OUR REGULAR CORRESPONDENT]

Paper

Bonds	.09½	@	.53
Ledgers	.15	@	.40
Writings—			
Superfine	.15	@	.20
Extra fine	.12	@	.22
Fine	.20	@	.30
Fine, No. 2	.20	@	.25
Fine, No. 3	.15	@	.20
Book, M. F.	.09¼	@	.12¼
Book, S. S. & C.	.11	@	.15
Book, Coated	.14¼	@	.20
Coated Lithograph	.10	@	.15
Label	.10	@	.15
News	.05	@	.07
No. 1 Jute Manila	.12	@	.13
Manila Sul., No. 1	.08	@	.10
Manila No. 2	.07½	@	.08
No. 2 Kraft	—	@	.08½
No. 1 Kraft	—	@	.09½
Common Bogus	.03½	@	.04
Straw Board	65.00	@	70.00
News Board	60.00	@	65.00
Chip Board	55.00	@	60.00
Wood Pulp Board	2.75	@	3.00
(Carload Lots)			
Binder Boards—			
Per ton	70.00	@	75.00
Carload lots	65.00	@	70.00
Tarred Felts—			
Regular	61.00	@	63.00
Slaters	66.00	@	68.00
Best Tarred, 1-ply (per roll)	1.70	@	1.80
Best Tarred, 2-ply (per roll)	1.50	@	1.60
Best Tarred, 3-ply	2.00	@	2.10

Bagging

F. o. b. Phila.

Gunny No. 1—			
Foreign	1.45	@	—
Domestic	1.50	@	—
Manila Rope	6.00	@	6.50
Sisal Rope	1.25	@	—
Mixed Rope	1.30	@	—
Scrap Burlaps	1.00	@	1.25
Wool Tares, heavy	2.00	@	2.13
Mixed Strings	1.30	@	—
No. 1, New Lt. Burlap	2.00	@	—
New Burlap Cuttings	2.00	@	2.25

Old Papers

F. o. b. Phila.

Shavings—			
No. 1, Hard White	4.25	@	4.40
No. 2, Hard White	3.50	@	3.75
No. 1 Soft White	3.25	@	3.50
No. 2 Soft White	2.15	@	2.25
No. 1 Mixed	1.60	@	1.75
No. 2 Mixed	1.25	@	1.50
Solid Ledger Stock	2.25	@	2.50
Writing Paper	2.00	@	2.25
No. 1 Books, heavy	2.00	@	2.25
No. 2 Books, light	1.40	@	1.50
No. 1 New Manila	2.75	@	3.00
No. 1 Old Manila	1.75	@	2.00
Container Manila	1.25	@	1.50
Old Kraft	2.25	@	2.50
Overissue News	1.25	@	1.35
Old Newspaper	.90	@	1.00
No. 1 Mixed Paper	1.00	@	1.10
Common Paper	.80	@	.90
Straw Board, Chip	1.00	@	1.10
Binders Bd., Chip	1.00	@	1.10

Domestic Rags—New.

Price to Mill, f. o. b. Phila.

Shirt Cuttings—			
New White, No. 1	.13	@	—
New White, No. 2	.07	@	—
Silesias, No. 1	.08¼	@	.08½
New Unbleached	.11	@	.11½
Washable	.05	@	.05½
Fancy	.06½	@	.06¼
Cottons—according to grades—			
Blue Overall	.08¼	@	.09
New Blue	.03¼	@	.04
New Black Soft	.06	@	.06¼
New Light Seconds	.03½	@	.03¼
Khaki Cuttings	.05½	@	.06
Corduroy	.04	@	.04½
New Canvas	.10½	@	.11
New Black Mixed	.05¼	@	.05½
Old			
White, No. 1—			
Repacked	3.75	@	3.75
Miscellaneous	.05½	@	.05¾
White, No. 2—			
Repacked	.05	@	.05¼
Miscellaneous	.04¼	@	—
Thirds and Blues—			
Repacked	3.75	@	—
Miscellaneous	3.25	@	—
Black Stockings	4.25	@	4.75
Roofing Stock—			
No. 1	2.35	@	2.45
No. 2	2.15	@	2.25
No. 3	2.05	@	2.15
No. 4	2.05	@	2.15
No. 5A	1.75	@	—
B			nominal
C			nominal

BOSTON

[FROM OUR REGULAR CORRESPONDENT.]

Paper

Bonds	.09	@	.63
Ledgers	.09	@	.55
Writings	.08½	@	.42
Superfine	.16	@	.26
Fine	.15	@	.18
Books, S. & S. C.	.07¼	@	.12
Books, M. F.	.07¼	@	.09½
Books, coated	.09	@	.15
Label	.09	@	.13
News, sheets	4.75	@	6.00
News, rolls	4.00	@	4.50
Manilas—			
No. 1 Manila	6.00	@	7.00
No. 1 Fiber	.06½	@	.07
No. 1 Jute	9.00	@	10.50
Kraft Wrapping	.07	@	—
Common Bogus	3.50	@	3.85

Boards

(Per Ton Destination)

Chip	40.00	@	45.00
News, Vat Lined	40.00	@	45.00
Wood, Vat Lined	50.00	@	52.50
Filled News Board	40.00	@	47.50
Solid News Board, No. 4 Finish	60.00	@	—
S. Manila Chip	60.00	@	65.00
Pat. Coated News	77.50	@	87.50

Old Papers

Mixed paper	.50	@	.55
Folded news	.65	@	.70
Soft white shavings	2.75	@	2.90
Hard white shavings	3.60	@	4.00
Kraft Paper	2.00	@	2.10
Ledger and letter	2.15	@	2.35
No 1 books and magazines	1.45	@	1.62½
Manila paper No. 1	1.70	@	1.75
Solid ledgers	2.50	@	2.75
No. 1 Roofing rags	2.10	@	2.25
No. 2 Roofing rags	2.00	@	2.10
No. 3 Gunny bag-			
No. 4 Brussels and hard back carpets	1.20	@	1.30
No. 5 Roofing rags—			
A's	1.25	@	1.35
B's	—	@	—
C's	—	@	—
No. 6 City dump rags	—	@	—
Manila rope, domestic	.06	@	.06½
Mixed strings	1.05	@	1.15
Jute strings	1.30	@	1.40

TORONTO

Paper

(Mill Prices to Jobbers f. o. b. Mill)

Bond—			
Sulphite	.11	@	.12½
Light tinted	.12	@	.13½
Dark tinted	.13¼	@	.15
Ledgers (sulphite)	—	@	.13
Writing	.09¼	@	.12
News, f. o. b. Mills—			
Rolls (carloads)	3.75	@	—
Sheets (carloads)	—	@	4.50
Sheets (2 tons or over)	—	@	4.75
Book—			
No. 1 M. F. (carloads)	9.00	@	—
No. 2 M. F. (carloads)	8.00	@	—
No. 3 M. F. (carloads)	7.50	@	—
No. 1 S. C. (carloads)	9.50	@	—
No. 2 S. C. (carloads)	8.50	@	—
No. 1 Coated and litho	14.50	@	—
No. 2 Coated and litho	13.50	@	—
No. 3 Coated and litho	12.75	@	—
Wrapping—			
Rag Brown	4.75	@	—
White Rap	5.25	@	—
"B" Manila	5.50	@	—
No. 1 Manila	6.50	@	—
Fiber	6.50	@	—
Kraft, M. F.	7.00	@	—
M. G.	7.15	@	—

Pulp

(F. o. b. Mill)

Ground wood	$34.00	@	36.00
Sulphite easy bleaching	55.00	@	60.00
Sulphite news grade	52.50	@	55.00
Sulphite, bleached	75.00	@	80.00
Sulphite	60.00	@	65.00

Old Waste Paper

(In carload lots, f. o. b. Toronto)

Shavings—			
White Env. Cut.	4.00	@	—
Soft White Book shavings	3.20	@	3.30
White Blk. News	2.15	@	2.20
Book and Ledger—			
Flat Magazine and Book Stock(old)	1.35	@	—
Light and Crumpled Book Stock	1.20	@	—
Ledgers and Writings	1.85	@	—
Solid Ledgers	2.00	@	—
Manilas—			
New Manila Cut.	—	@	2.00
Printed Manilas.	1.55	@	—
Kraft	2.05	@	—
News and Scrap—			
Strictly Overissue	.90	@	—
Folded News	.90	@	—
No. 1 Mixed Papers	—	@	.75
Domestic Rags—			
Price to mills, f. o. b. Toronto Per lb.			
No. 1 White shirt cuttings	.12¼	@	.13
No. 2 White shirt cuttings	.06½	@	.07
Fancy shirt cuttings	.06¼	@	.06½
No. 1 Old Whites	—	@	—
Third and blues	.03¼	@	.03½
Per cwt.			
Black stockings	.03	@	—
Roofing stock:			
No. 1	—	@	—
No. 2	—	@	—
Manila rope	.06¼	@	.06½
No. 2	1.55	@	—

TO SELL LIME SLUDGE TO FARMERS

Approximately 10,000 tons of lime sludge, required by farmers to neutralize the acid in their soils, will be available at the Wausau Sulphate Fibre Company plant at Mosinee, Wis., in the spring, according to J. C. Justesen, traffic manager for the company, who is urging farmers to make use of this opportunity to obtain fertilizer at a nominal cost. Last year about 50 carloads of lime sludge was shipped from the plant and more than 500 truckloads were hauled away by farmers.

The company is charging only $10 a carload for the lime sludge to cover its cost of loading and handling. The product cannot be shipped or hauled away in the cold months and the company has been storing it during the winter. The sulphate company recently requested the Wisconsin railroad commission to fix lower freight rate on lime sludge in order to reduce the deliver cost to farmers.

Mr. Justesen also said that the sulphate plant at Tomahawk, which will be ready in the spring, also will produce a large quantity of lime sludge which will be available to farmers. County agricultural agents are advocating the use of this lime on soils in order to increase their fertility.

FOREST ENGINEER REPORTS BUSY YEAR

Philip T. Coolidge, a consulting forest engineer at Bangor, Me., states that 1923 proved to be the busiest year yet experienced.

Reports and maps on timberlands examined in Maine, New Hampshire and Quebec covered between 7,500,000 and 8,000,000 acres. The character of the projects undertaken comprised rough reconnaissance for the purchase or sale of land, detailed plans for logging operations, investigation of damage by insects and fire, boundary surveys, and investigations for the Board of State Assessors of Maine.

One project, of several thousand square miles on the Manicouagan river in Quebec, required the use of an airplane in co-operation with the Laurentide Aire Service of Canada. Activity is noted not only in pulpwood lands, but in pine lots in central New England, and he states that prospects for continued good business in the present year appear excellent.

New York Market Review

OFFICE OF THE PAPER TRADE JOURNAL,
THURSDAY, APRIL 10, 1924.

Convention week always means that there is a slight falling off in the amount of business done in all of the lines. When the paper men got together in the Waldorf Astoria to talk over the past year and make plans for the future they took a few days of rest from the usual trading.

While there was no real change in prices or in the general situation there is a firm undertone throughout the whole market and a more optimistic feeling pervades all of the lines than it did several weeks ago. It seems to be definitely assured that the paper business is going to have a brief but good period of trading before the arrival of the usual summer dullness.

For some time there has been over production in a number of the varieties, but this condition has just about righted itself in the main and the dealers have gotten most of the excess supplies off their shelves. They are beginning to come into the market a little more strongly for futures even now and leaders of the industry predict that the demand will continue to gain until the dealers feel comfortably able to supply their customers over a long period once more.

There is general feeling that prices are stabilizing along with the demand and this, of course, will mean a much better business. Many of the men in the industry are very much worried over the import situation and steps are being taken to remedy the evils which are being charged up to those bringing paper into this country from foreign countries. This has given new hope to many manufacturers who felt that they were losing in the fight with imported papers. Most of the mills are still running at full time and manufacturers say that they are getting enough orders to maintain this condition. The general condition of business is fair with every prospect of further improvement.

News print is still moving faster than most of the other commodities on the market. Rolls are in good demand and sheets and side runs are not far behind. Manufacturers say that they have nearly all of the business they can handle and they are very optimistic about the immediate future.

Book paper is just about the same as it was last week with little change in either one direction or the other. The mills are running pretty generally at a hundred per cent, but there are some exceptions to this. There still seems to be a little over production in a few mills, but it is reported that this is being gradually taken up.

Fine papers are also in fairly good demand with an increasing call for some of the finer grades. Many of the bonds appear to be a trifle more popular than they were a few weeks ago.

Kraft is still lagging somewhat behind the other papers, but it, too, is improving. Dealers in coarse paper and in tissue say that there are a few mills that are upsetting the market by making offerings below the market price. One coarse paper man reports that some of the manufacturers in the west are offering kraft at a figure below which it is possible for them to make any money.

Board is in about the same condition that it has been for some time past. It is moving along in a fairly stable manner with no movement of any great significance in either direction. The manufacturers and dealers think that this is a good sign and they say that they have hopes that this will be the forerunner of a long and stable period in this part of the market.

Mechanical Pulp

Mechanical pulp is moving along with news print. The demand is good in all quarters and the mills have plenty of business. It is not surprising that this condition exists since news print mills have been making a steady demand on the grinders for months past that has kept them going at full speed.

Chemical Pulp

Sulphite continues to be in somewhat better demand than it was and buyers are showing a reasonable amount of interest. The supplies which the dealers had on hand for some time are now just about used up and the mills are showing signs of speeding up a bit.

Old Rope and Bagging

Old rope continues to be in fair demand although it is not quite so good as it was a month or two ago when all prices took a rise. The same is true of bagging although that has run along pretty steadily in good shape ever since the baby boom in the middle of the winter.

Rags

Rags are in fair demand particularly in the cheaper grades. The roofing mills are showing a decided interest in them and buying, while it is not heavy, is good enough to keep the dealers in a reasonably optimistic frame of mind. Importations have been just about the same during the past week.

Waste Paper

Waste paper is also holding up about the same as it has been. The disinclination of some of the buyers to lay in pulp brought a flurry of prosperity to the waste market which sent prices up and did much to keep them there. The dealers say that they are pleased with the condition and they believe that it is going to continue.

BROWN CORP. TO EXPAND

The Brown Corporation, which operates a 320-ton sulphate pulp mill at La Tuque, is planning enlargement of its Canadian property for the further production of by-products. Attention has been drawn to the Company by the recent offer of $200,000 of preferred stock which, however, does not indicate any new financing as this stock has been outstanding for some time and has been held in the treasury of the parent company. At the present time the Brown Corporation is manufacturing turpentine at La Tuque. With the addition of further equipment it will be possible to manufacture not only turpentine but chloroform, industrial alcohol, bi-sulphite of carbonate, caustic soda, bicarbonate of soda and fiber tubing for underground electrical conduits. Most of these are manufactured from the waste liquor drained out of the digester after the sulphite pulp is manufactured.

COMPETITION FOR HELP RAISES WAGES

The Nekoosa and Port Edwards mills of the Nekoosa-Edwards Paper Company also are competing in a safety contest, with the Nekoosa mill leading. The previous record of 41 days without an accident, set by the Port Edwards mill, was broken by the Nekoosa employees.

The safety contest was started as part of the effort to reduce the number of accidents in the company's mills at least 25 per cent during 1924. In January the Nekoosa mill escaped without an accident, while there was one at Port Edwards. The last accident at the Nekoosa mill was on February 4. An injury is counted if a man is unable to return to the shift on which he is working. The safety campaign slogan is: "Educate the careless man. If you can't educate, eliminate him."

LAUREL, MISS., SUITED FOR PULP MILL

W. H. "Corn Club" Smith, secretary manager of the Laurel Chamber of Commerce, has returned from Bogalusa, La., where he inspected the new paper mills in that city in order to compare the raw materials available in the Laurel territory with those around Bogalu and to ascertain the most economical products which can be made from second growth pine timber.

Mr. Smith stated that he is satisfied that Laurel has an equally good supply of raw materials and water and that he can see no reason why Laurel can not have successful paper mills.

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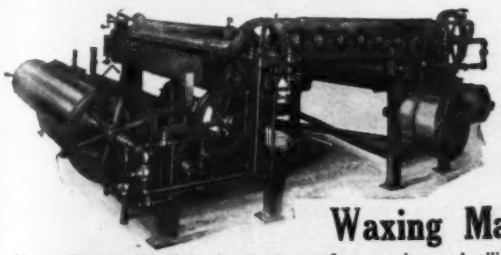

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Cubic ft. 594
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Dayton, Ohio

1

Miscellaneous Markets

OFFICE OF THE PAPER TRADE JOURNAL,
THURSDAY, APRIL 10, 1924.

The chemical market is still in the same fair condition that it has been for the past few weeks. This is not altogether due to a demand from the paper trade but mainly from other industries which happen to be calling for the same commodities that are listed for the paper manufacturer. The paper industry is not buying quite all that it should, but the demand is picking up and there is every reason to believe that it is going to continue to do so.

BLEACHING POWDER.—Bleach has not risen any higher in prices after the change of two weeks ago. There is still a good demand for it and manufacturers say that they are well pleased with the amount of business they are doing. The quotation is now at 3.10 to 3.15 cents on a flat basis at the works.

CAUSTIC SODA.—Caustic has remained just about the same during the past week with no real change in either one direction or the other for some time. The demand is good on the open market although it is not quite up to the expectations of the dealers. The paper industry is showing an inclination to come in for it with more firmness and it is looking toward improvement. The price is still 3.10 to 3.15 cents a pound on a flat basis at the works.

CASEIN.—Although casein has been subject to a good deal of fluctuation during the past few months it seems to have settled down at last to a steady price. It is quoted at from 11 to 12 cents a pound.

CHINA CLAY.—China clay has not been in quite as good demand during the past week as it was before, but still a fair number of orders are going through the market and dealers and importers say that they are satisfied that the dull condition is merely temporary. The price on the imported grades is from $16 to $20 a ton and on the domestic it is from $12 to $15 a ton.

CHLORINE.—There has been no further rise in the price of chlorine for the past week and the demand is continuing strong in the local market. The price is still at 4.50 to 5.00 cents a pound in tanks.

ROSIN.—Rosin fell off a little in price during the past couple of weeks but this movement now seems to have been checked and the dealers say that the present price represents somthing pretty close to rock bottom. It is now quoted at from $5.75 to $5.85 in 280 pound barrels.

SALTCAKE.—There is no change in the condition in the saltcake market for the past week. It is moving with a fair amount of regularity in the open market although dealers say that the condition might be somewhat better. The price is still at from $20 to $23 a ton.

SODA ASH.—Soda ash is in pretty good demand although there is still some room for improvement, according to reports from the local dealers. The price continues at 1.38 cents a pound on a flat basis.

SULPHATE OF ALUMINA.—Alumina is still in good demand with prices showing signs of stiffening a little after the slight falling off of a few weeks ago. Apparently the buyers are showing a great deal more interest with the commercial grade now at from 1.15 to 1.30 cents while iron free is from 2.10 to 2.25 cents a pound.

PROGRAM FOR NEW ORLEANS MEETING

The date for the first meeting of the Southern Division of the American Pulp and Paper Mill Superintendents' Association has been advanced to April 17 because of an invitation that has been received from W. H. Sullivan, vice-president of the Bogalusa Paper Company, to spend the entire day Saturday at Bogalusa as guest of the company.

A very attractive program for the convention, which will be held at the St. Charles Hotel, has been prepared. The meeting will be called to order on Thursday by R. H. Laftman, assistant general manager of the Bogalusa Paper Company. The morning and afternoon sessions will include the following papers and addresses:

"Aims and Purpose of the Superintendents' Association," by E. T. A. Coughlin, superintendent, Allied Paper Mills, Kalamazoo, Mich.

"The Use of Cutless Rubber Bearings in Pulp Mill Operations," by C. F. Sherwood, inventor of Rubber Bearings, B. F. Goodrich Rubber Company, Akron, Ohio.

"The Manufacture of Felt," C. T. Hammill, Albany Felt Company, Albany, N. Y.

"Abuse of Felts in Paper and Pulp Mill Operations," by William MacLaren, Albany Felt Company, Albany, N. Y.

"Sizing of Kraft Papers," by William J. Lawrence, vice-president and general manager, Western Papermakers Chemical Company, Kalamazoo, Mich.

The banquet will be held at the St. Charles Hotel, Thursday evening, with R. H. Laftman as toastmaster. P. J. Massey, production manager of the W. F. Hall Printing Company, Chicago, will speak on "Association Work with Superintendents."

Friday morning will be devoted to seeing points of interest in New Orleans. E. T. A. Coughlin will preside at the afternoon session, at which the following addresses and papers will be presented.

"Benefit to Be Derived from Superintendents' Association," by L. D. Post, New York.

"By-Products in Pulp Manufacture," by John D. Rue and Sidney D. Wells, Forest Products Laboratory, Madison, Wis.

"Water in the Manufacture of Kraft," B. T. McBain, assistant general manager of the Nekoosa Edwards Paper Company, Port Edwards, Wis.

"Value of White Water Waste," by R. A. Hayward, Director of Paper Mill Engineering, University of Michigan, Ann Arbor, Mich.

The entire day Saturday will be spent at Bogalusa and the program will include inspection of the mills of the Bogalusa Paper Company. W. H. Sullivan, vice-president of the company and mayor of the city, will explain the reforestation helps of the Bogalusa Paper Company.

EARNINGS OF ABITIBI COMPANY

For the year ended December 31, 1923, the annual financial statement of the Abitibi Power and Paper Company, Limited, now going forward to shareholders, showed a balance after all charges, including preferred dividends, of $2,396,769 applicable to the common stock of the company, which is equal to $9.59 per share on the 250,000 shares of no par value outstanding. This compares with $1,812,323 or $7.24 a share in the previous year. Receipts from sales of paper and pulp during the year under review are shown at $11,047,667, which compares with $9,461,299 in 1922. Operating, general and administration expenses in 1923 are shown at $6,768,088 which compares with $5,846,462 in 1922, and thus net earnings at $4,279,579 compares with $3,614,837 in 1922. After the deduction of depreciation charges and preferred and common dividends there remained a balance of $1,396,769, which, added to the previous balance of $4,807,238, brings the total profit and loss balance to $6,204,007.

ERECTING ADDITION TO BRAMPTON PLANT

The plant of Gummed Papers, Limited, Brampton, Ont., is being extended. A new building, 90 x 150 feet, has been put up and is nearly completed. Progress on the work has been somewhat impeded by frost. The company manufactures cloth lined and gummed papers, water proof papers, cloth tapes, stay papers, etc.